October 15, 2019

MEMORANDUM **UTAH DEPARTMENT OF TRANSPORTATION**

TO: Kris Peterson, P.E., Chairman

FROM: Brad Yeates
Recorder, Standards Committee

SUBJECT: Standards Committee Meeting Minutes and Next Meeting

The next meeting has been scheduled for Thursday October 31, 2019 at **8:30 a.m.**, in the 1st Floor, Redwood A conference room of the Rampton Complex.

All agenda item approval for 2017 Standards only.

Item		**Remarks**	**Sponsor**
1.	Minutes of August 29, 2019	For approval (page 5)	Brad Yeates
2.	Standard Specification 16530M, Electrical Power	For approval (page 21)	Jesse Sweeten
3.	TC Standard Drawing Series (See listing)	For approval (page 49)	Justin Wilstead
4.	Standard Specification 02844M, Concrete Barrier	For approval (page 63)	Shawn Debenham
5.	Standard Drawing CC 9, Grading and Installation Details MFLEAT End Treatment Type H (MASH) (NEW DRAWING)	For approval (page 71)	Shawn Debenham
6.	Standard Drawings, BA Series, F-Shape Related (See listing)	For approval (page 78)	Shawn Debenham
7.	Standard Specification 13594M, Fiber Optic Communication	For approval (page 111)	Michael Adams
8.	Review of Assignment/Action Log	For discussion (page 19 & 117)	Brad Yeates
9.	Other Business: a) Review of all editorial changes this cycle.	For discussion a)(page N/A)	Kris Peterson

KP/by
Attachments

10a: Editorial Updates
N/A

Agenda Listing

Item 3	**Justin Wilstead**
TC 06	Temporary Pedestrian Access Route **(DELETION)**
TC 06A	Temporary Pedestrian Access Route (TPAR) – Ramp Details
TC 06B	Temporary Pedestrian Access Route (TPAR) – Walkway and Device Details
TC 06C	Temporary Pedestrian Access Route (TPAR) – Diversion
TC 06D	Temporary Pedestrian Access Route (TPAR) – Detour
TC 01	Traffic Control Drawing Series General Notes **(ADDED PER 2 WEEK REVIEW COMMENT)**
Item 6	**Shawn Debenham**
BA 1A1	Concrete Barrier General Notes and Standard Details 1 of 3
BA 1A2	Concrete Barrier General Notes and Standard Details 2 of 3
BA 1A3	Concrete Barrier General Notes and Standard Details 3 of 3 **(NEW DRAWING)**
BA 1B	Concrete Barrier Median Installation
BA 1C	Concrete Barrier Shoulder Installation
BA 1D	Concrete Barrier Layout
BA 1F1	Concrete Barrier F-Shape Installation **(NEW DRAWING)**
BA 1F2	Free Standing Barrier F-Shape, Cast-in-place Barrier Transition 1 of 3 **(NEW DRAWING)**
BA 1F3	Free Standing Barrier F-Shape, Cast-in-place Barrier Transition 2 of 3 **(NEW DRAWING)**
BA 1F4	Free Standing Barrier F-Shape, Cast-in-place Barrier Transition 3 of 3 **(NEW DRAWING)**
BA 2A	Precast Concrete Barrier – 32 Inch F-Shape **(Title Change)**
BA 2B	Precast Concrete Barrier – 32 Inch F-Shape Sloped End Section (For Speeds ≤ 40 MPH) **(Title Change)**
BA 2C	Precast Concrete Barrier – 32 Inch F-Shape New Jersey Shape Transition **(NEW DRAWING)**
BA 2D	Cast-In-Place Concrete Barrier – 32 Inch F-Shape, 42 Inch Constant Slope Barrier Transition **(Title Change)**
BA 2E	Precast Concrete Half Barrier – 32 Inch F-Shape **(Title Change)**
BA 3I1	Precast Concrete Constant Slope Barrier – 42 Inch Median Small Sign Section 1 of 2 **(DELETION)**
BA 3I2	Precast Concrete Constant Slope Barrier – 42 Inch Median Small Sign Section 2 of 2 **(DELETION)**
BA 3J	Precast Concrete Constant Slope Barrier – 42 Inch, 32 Inch F-Shape Transition **(Title Change)**
BA 3K5	Cast-In-Place Concrete Half Barrier – 42 Inch Constant Slope, 32 Inch F-Shape Barrier Transition **(Title Change)**
BA 3Q2	Cast-In-Place Concrete Constant Slope Barrier – 54 Inch, 32 Inch F-Shape Barrier Transition **(Title Change)**

cc:

Lisa Wilson Director, Region One	Fred Doehring Central Preconstruction	George Lukes Standards and Design
Bryan Adams Director, Region Two	Cheryl Hersh-Simmons Structures	Brad Yeates Standards
Rob Clayton Director, Region Three	Ken Talbot Construction	Vincent Liu Research
Rick Torgerson Director, Region Four	Scott Andrus Materials	Rob Wight Operations
	Daniel Page Maintenance	Russ Robertson FHWA
	Robert Miles Traffic and Safety	Betty Purdie AGC
	Michael Adams Traffic Management Division	Derek Lahusen ACEC
	Brett Slater Region One, Preconstruction	

August 29, 2019

A regular meeting of the Standards Committee convened at 8:30 am, Thursday, August 29, 2019 in the 1st Floor, Redwood A conference room of the Rampton Complex.

Members Present:

Kris Peterson	Project Development	Chairman
Fred Doehring	Central Preconstruction	Member (V)
George Lukes	Preconstruction and Standards	Member, Secretary (V)
Brad Yeates	Preconstruction, Standards	Member, Recorder (NV)
Rick Torgerson	Region 4, Director	Member (V)
Brett Slater	Region 1, Preconstruction	Member (V)
Ken Talbot	Construction	Member (V)
Cheryl Hersh Simmons	Structures	Member (V)
Robert Miles	Traffic and Safety	Member (V)
Scott Andrus	Materials	Member (V)
Michael Adams	TOC	Member (V)
N/A	Maintenance	Member (V)
Betty Purdie	AGC	Advisory Member (NV)
N/A	Research	Advisory Member (NV)
Russ Robertson	FHWA	Advisory Member (NV)
N/A	ACEC	Advisory Member (NV)

V = Voting Member NV = Non-Voting Member

Members Absent:

Daniel Page (Materials)	Vincent Liu (Research)	Derek Lahusen (ACEC)

Staff:

Glenn Blackwelder	Traffic and Safety
Justin Wilstead	Traffic and Safety
Jesse Sweeten	Traffic and Safety
Shawn Debenham	Traffic and Safety
Tiffany Pocock	Statewide Design
Josh Van Jura	Construction
Robert Stewart	Construction
Bill Lawrence	Materials
Bin Shi	Materials
Tim Wozab	Materials
Ray Cook	Structures
James Corney	Structures
Chris Whipple	Region 2

Visitors:

Roland Stanger	FHWA

Standards Committee Meeting

Minutes of the August 29, 2019 meeting:

The meeting agenda package and agenda items were displayed on the large screen.

Use the following listing for the numbered Agenda Item to see the Standards covered by that particular item.

Agenda Listing for February items covered in the following minutes.

Item 4	**Justin Wilstead**
TC 06	Temporary Pedestrian Access Route (DELETION)
TC 06A	Temporary Pedestrian Access Route – Ramp Details
TC 06B	Temporary Pedestrian Access Route – Device Details
TC 06C	Temporary Pedestrian Access Route – Diversion
TC 06D	Temporary Pedestrian Access Route – Detour
Item 5	**Shawn Debenham**
BA 1A1	Concrete Barrier General Notes and Standard Details 1 of 2
BA 1D	Concrete Barrier Layout
BA 1E	Concrete Barrier Column Protection
BA 2A	Precast Concrete Barrier – 32 Inch New Jersey Shape
BA 2B	Precast Concrete Barrier – 32 Inch New Jersey Shape, Sloped End Section (For Speeds ≤ 40 MPH)
BA 2C	Precast Concrete Barrier – 32 Inch New Jersey Shape, Median Small Sign Section **(DELETION)**
BA 2D	Cast-In-Place Concrete Barrier – 32 Inch New Jersey Shape, 42 Inch Constant Slope Barrier Transition
BA 2E	Precast Concrete Half Barrier – 32 Inch New Jersey Shape
BA 3A1	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch 1 of 3
BA 3A2	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch 2 of 3
BA 3A4	Cast-In-Place Concrete Constant Slope Barrier with Scuppers - 42 Inch
BA 3B	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch Electrical Details
BA 3C1	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch, Sign Structure Foundation Transition 1 of 2
BA 3D	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch, Median Small Sign Section **(DELETION)**
BA 3E1	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch, TL-5 1 of 2
BA 3E3	Cast-In-Place Concrete Constant Slope Barrier with Scuppers - 42 Inch TL-5
BA 3F1	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch, Bridge Parapet Transition 1 of 3
BA 3F2	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch, Bridge Parapet Transition 2 of 3
BA 3G	Precast Concrete Constant Slope Barrier- 42 Inch

BA 3H	Precast Concrete Constant Slope Barrier- 42 Inch, Sloped End Section (For Speeds ≤ 40 MPH)
BA 3I1	Precast Concrete Constant Slope Barrier- 42 Inch, Median Small Sign Section 1 of 2
BA 3J	Precast Concrete Constant Slope Barrier- 42 Inch, 32 Inch New Jersey Shape Transition
BA 3K1	Cast-In-Place Concrete Constant Slope Half Barrier- 42 Inch
BA 3K2	Cast-In-Place Concrete Constant Slope Half Barrier with Scuppers - 42 Inch
BA 3K3	Cast-In-Place Concrete Constant Slope Half Barrier- 42 Inch
BA 3K5	Cast-In-Place Concrete Constant Slope Half Barrier- 42 Inch Constant Slope, 32 Inch New Jersey Shape Barrier Transition
BA 3L	Precast Concrete Constant Slope Half Barrier- 42 Inch
BA 3M1	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch 1 of 3
BA 3M2	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch 2 of 3
BA 3M4	Cast-In-Place Concrete Constant Slope Barrier with Scuppers - 54 Inch
BA 3N1	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch, Median Small Sign Section 1 of 2 **(DELETION)**
BA 3N2	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch, Median Small Sign Section 2 of 2 **(DELETION)**
BA 3O1	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch, TL-5 1 of 3
BA 3O2	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch, TL-5 2 of 3
BA 3O4	Cast-In-Place Concrete Constant Slope Barrier with Scuppers - 54 Inch, TL-5
BA 3P1	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch, Bridge Parapet Transition 1 of 3
BA 3P2	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch, Bridge Parapet Transition 2 of 3
BA 3Q1	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch, 42 Inch Constant Slope Barrier Transition
BA 3Q2	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch, 32 Inch New Jersey Shape Barrier Transition

Item 6	**Jesse Sweeten**
SL 6D	Overhead Flashing Beacon at an Intersection Crosswalk
SL 6F	Overhead Flashing Beacon at a Midblock Crosswalk

Item 7	**Tiffany Pocock**
GW 1A	Raised Island
GW 7A	Delineation Application
PA 06	Roundabout, Transit Shelter, and On-Street Parking
RR 06	Pedestrian Controls Street Running Railroad Alignment Signalized Intersections
RR 07	Pedestrian Controls Street Running Railroad Alignment Unsignalized Intersections
SL 6E	Post-Mounted Flashing Beacon at an Intersection Crosswalk

SL 6G	Post-Mounted Flashing Beacon at a Midblock Crosswalk
ST 01	Typical Pavement Markings **(NAME CHANGE)**
ST 02	Passing Lane Detail **(DELETION)**
ST 02	School Crossing and School Message **(NEW DRAWING. Renumbered ST 08)**
ST 03	Contrast Pavement Markings for Concrete Pavement **(NEW DRAWING. Renumbered ST 09)**
ST 03A	Freeway Climbing Lane Inside Widening Detail **(DELETION)**
ST 03B	Freeway Climbing Lane Outside Widening Detail **(DELETION)**
ST 04	Entrance Ramp Pavement Markings **(DELETION)**
ST 05	Exit Ramp Pavement Markings **(DELETION)**
ST 06	Intersection Pavement Markings **(DELETION)**
ST 07	Crosswalks, Parking, and Intersection Approached **(DELETION)**
ST 08	School Crossing and School Message **(DELETION, renumber as ST 2)**
ST 09	Contrast Pavement Markings for Concrete Pavement **(DELETION, Renumber as ST 03)**
ST 10	Bicycle Lane Pavement Markings (Sheet 1 of 2) **(DELETION)**
ST 11	Bicycle Lane Pavement Markings (Sheet 2 of 2) **(DELETION)**
ST 12	Location of Bicycle Detector Pavement Messages at Intersection **(DELETION)**
ST 13	Two-Lane Intersection Pavement Markings (Sheet 1 of 2) **(DELETION)**
ST 14	Two-Lane Intersection Pavement Markings (Sheet 2 of 2) **(DELETION)**
ST 15	Preferential Lane Signing and Pavement Marking Details **(DELETION)**
ST 16	Preferential Lane Access Opening Details **(DELETION)**
ST 17	Preferential Lane Median Signing Spacing Greater 1 Mile **(DELETION)**
ST 18	Preferential Lane Median Signing Spacing Equal to or Less than 1 Mile **(DELETION)**

Item 8	**Bin Shi**
01455	Materials Quality Assurance **(TITLE CHANGE)**
01457	Aggregate Source Control **(NEW SPECIFICATION)**
02753M	Full Depth Slab Replacement for Concrete Pavements
02755M	Concrete Slab Jacking

Item 9	**Michael Adams**
13556M	Closed Circuit Television (CCTV) Assembly
AT 10A	Axis CCTV Mounting Detail and Wiring Diagram
AT 10B	CCTV Mounting Detail and Wiring Diagram
AT 10C	CCTV Mounting Detail and Wiring Diagram **(DELETION)**
AT 10D	Camera Cable Splicing Diagrams **(DELETION)**
AT 10E	CCTV Dip Switch Settings **(DELETION)**
AT 11A	CCTV Pole Mounting Details
AT 11B	Non-Intrusive Detector Mounting Details

Minutes start here.

1. Minutes of June 27, 2019 meeting were approved as presented

   Discussion points were:

   - There was no discussion on the minutes.

   Motion: Robert Miles made a motion to approve the minutes as discussed. Seconded by Mike Adams. Passed unanimously.

***************Because of scheduling conflicts for the presenter, Item # 7 was presented first. **********************

2. Standard Specification 03211, Reinforcing Steel and Welded Wire (Agenda Item 2) – Presented by James Corney.

   James presented the change as follows:

   - This revision was initiated by a need to provide the correct testing criteria to meet AASHTO's design methodology for post-installed epoxy anchors. The epoxy currently specified is less stringent than what is required. It was then found that we have incorrect or missing ASTM's for coatings on reinforcing steel and welded wire that should be corrected or added. In making those corrections it was requested to add additional guidance for the repair of those coatings in order to help our inspectors and contractors know what we expect for a repaired bar coating. And we found a need for clarification in the ABC grouted splice couplers mention by a manufacturer's technical representative, but do not define it in part 1. As part of that modification, because of the criticality of the ABC connections the technical representative is proposed to be onsite for the preparation and grouting.

   - Kris said that Ken and Ray had a lot of comments. He asked Ken if he felt like his comments were sufficiently addressed. Ken said yes. He asked Ray the same thing and Ray also said yes. Kris also asked Betty if she was okay with everything and she said yes.

   - Kris also briefly mentioned it was the first time he had ever seen a picture in a comment response. James said that is was just for clarification of his comment.

   Discussion points were:

   - There was no further discussion.

Motion: Fred Doehring made a motion to approve the agenda item as presented. Seconded by Robert Miles. Passed unanimously.

3. Standard Specification 01554, Traffic Control (Agenda Item 3) Presented by Justin Wilstead.

Justin presented the change as follows:

- We updated the language to include MASH (Manual on Assessing Safety Hardware) references and requirements to meet FHWA. We updated the definition to include TPAR (Temporary Pedestrian Access Route). We also made other corrections to clarify intent of previous spec language and better organize content.
  We also had to include information for existing traffic control devices other than precast barrier that meet previous crashworthiness requirements that are allowed to be used until December 31, 2022. New devices manufactured after December 31, 2019 will be required to meet MASH criteria. This will allow contractors to phase out old devices through their normal life cycle.

- Kris addressed both Justin and Shawn. He said that the AGC has had a lot of concerns about the ATSSA requirements and training. How does this interact with ATSSA? Justin said they are meeting with AGC over the next few weeks to go over some of the requirements and costs. Justin said that they are looking to move to all ATSSA training for everyone for consistency. Kris asked if as of this spec rewrite if the ability for the AGC was being taken away. Justin said no. For now they are still able to train. But they will be moving toward all ATSSA. Glenn said that as of now they are only requiring ATSSA TCT (Traffic Control Technician) training.

- Kris brought up MASH and said that they are still hoping for some leniency but in the meantime asked if this spec was MASH ready if the date remains December 31. Glenn said yes. Fred then asked if we could expect some kind of update or supplemental to this spec if the FHWA backs off on the date. Glenn mentioned that they didn't think so, but they'd reevaluate at that time. Kris went over some of the issues with MASH and the backlog of MASH testing to approve devices.

- Kris asked about 3.1D1C and the clearing of sidewalks in a work area so that they contractor is required to clear areas where the property owner should clear when a TPAR is involved. Kris went over an example of what he meant and who is ultimately responsible. Fred went over some of his reasoning of why the contractor is ultimately responsible. Betty said if you do this you are opening a whole bunch of problems with trees and bushes and things that also obstruct a walkway. Several people had different

opinions that were shared. Robert said that there are issues with ADA compliance as well. The group tried to work through the best wording for the section article. There were multiple discussions happening throughout the room.

- Kris asked about the time allotted in 3.3C1b. Glenn went over the methodology of giving more time if a barrel remover is used. Are we trying to incentivize the use of a barrel mover and Glenn said yes. Shouldn't they all be within 24 hours? Robert said are we really saying that because a barrel mover is used that all these barrels are safer than other barrels to leave for longer periods? The group went back and forth about the merits of 24 hours and 48 hours.

- Fred and Robert made a motion, but Betty brought up that the motion didn't completely solve the problem. After a lot more wording suggestions, Robert and Fred attempted another motion, but there was still some disagreement and nothing was resolved. Some more discussion and wording suggestions were brought to the table, but there was still some general disagreement and so in order to save time, Kris asked Fred, Robert, Glenn and anyone else in the room to work on wording while we moved forward with the meeting. This discussion was suspended until the end of the meeting while a few people worked on wording.

- After the ATMS presentation (agenda item # 9), Kris directed the group back to this item. George brought up the suggested wording from Fred and others on the screen for review. After brief discussion and slight revision to proposed rewording, the group agreed on a revision.

Motion: Fred Doehring and Robert Miles made a joint motion to approve the agenda item with modification to 3.1 and 3.3. Seconded by Brett Slater. Passed unanimously.

4. Standard Drawings, TC Series (See listing) (Agenda Item 4) Presented by Justin Wilstead.

- Robert Miles said they are going to withdraw this item to address late comments that the Traffic and Safety group believe need a closer look.

Discussion points were:

- There was no discussion

Motion: Robert Miles made a motion to not attempt to approve the agenda item as presented. Seconded by Fred Doehring. Not approved unanimously.

5. Standard Drawings, BA 1-3 Series (See listing) (Agenda Item 5) – Presented by Shawn Debenham.

Shawn presented the change as follows:

- Shawn said that his changes were to remove design notes from the drawings for their inclusion into the RDM, but stated that he agreed with Betty that these things shouldn't be removed from the Standard Drawings. Shawn said he believes that a lot of this information is needed to make decisions in the field. He said that as removed some of the design only notes for the RDM, he also reworded some of the design notes so that they would no longer be considered Design only so they could remain in the standard drawing set. I've only done the concrete barrier drawings because they are the least complicated. After this I'll start on the BA 4's and 5's.

- Shawn further detailed that some of the drawings had Designer only notes moved into the RDM. Some of the drawings had these kinds of notes moved but also had notes modified into construction notes so information is not missed in the field. One drawing was deleted because it has a non-MASH compliant sign base design.

Discussion points were:

- Shawn asked for BA 1E to be brought up on screen and said that one of the comments was for him to remove all of the Design notes, but he didn't agree. He said if we remove them, then the contractor has to rely on plan sheets and the plan sheets are not as detailed as this or any of the other barrier drawings. Kris asked for an example to be shown. Shawn used BA 1E. He pointed out some of them on screen. He used the drawing details on screen to give examples of when field personnel need to review and use these drawings.

- Cheryl said that if she is reading the drawing correctly, then in a contract drawing, field personnel can determine where to put the barrier and she used the drawing on screen to point out the large area they'd have to work within rather than placing it where it should be per the design. Betty pointed out that it should be designed but usually isn't and the contractor has to field fit the barrier. Without this drawing information that can't be done. Josh Van Jura pointed out that this should be information from the department and not the contractor doing it on their own. Betty said, you work with the RE on it but otherwise you would wait weeks for the new design plans. Chris Whipple said the biggest concern is who becomes the engineer of record when they are field fitting the barrier. Kris asked how we know it is being installed correctly. Josh said that the RE would

become the designer of record. Chris said that only applies if it was missed in design. If they design it and then its changes, the designer is still libel for the design. Fred said our designers need to do a better job and actually design the barrier and not just rely on the Standard Drawing.

- Several conversations happened simultaneously and the recording was garbled for a few minutes.

- Shawn agreed that there was an error on BA 1E. Rick and Kris suggested ways to modify it to correct it. Several people also made suggestions. No one could really agree on the best methodology to handle the wording of the note in order to use a motion to correct it.

- Kris finally suggested that we removed BA 1E from consideration and have it brought back next meeting. We can make a motion to approve everything but BA 1E. Shawn agreed that this was the best way to do it.

- Kris asked if anyone had any other comments. Fred said there were so many drawings he wondered if there could be more errors. Betty also mentioned that there were just too many drawings to review thoroughly. She suggested maybe making the groupings smaller if you want things reviewed better. Shawn asked how he should bring the rest of his drawings because they are coming. Kris said he wanted to talk about his at the end of the meeting.

Motion: Brett Slater made a motion to approve the agenda item with the removal of BA 1E from consideration for further work. Seconded by Cheryl Hersh Simmons. Passed unanimously.

6. Standard Drawings, SL Series (See listing) (Agenda Item 6) – Presented by Jesse Sweeten.

Jesse presented the change as follows:

- Because of questions expressed by field personnel and designers, clarifications and updates to the drawings have been requested for better understanding and applicability.

  SL 6D – This standard drawing detailed overhead flashing beacons with Type 0 signal heads but lacked information regarding an overhead rectangular rapid flashing beacon (RRFB) application. The RRFB option was added to this sheet along with updates and additions to the notes and callouts.

  SL 6F – This standard drawing detailed overhead flashing beacons with Type 0 signal heads but lacked information regarding an overhead

rectangular rapid flashing beacon (RRFB) application. The RRFB option was added to this sheet along with updates and additions to the notes and callouts.

The updates to SL 6E and 6G were also made, but they were presented in Tiffany's item as those drawings were also part of the updates the design group made.

Discussion points were:

- Kris asked to look at SL 6E because it has colored notes and clouds. He said that he wanted to have the discussion at the end of the meeting but someone commented to him that they could see the colors. He said it presented an accessibility issue for someone that is color blind.

Motion: Mike Adams made a motion to approve the agenda item as presented. Seconded by Brett Slater. Approved unanimously.

*****************The next item was presented first at the meeting.******************

7. Standard Drawings, ST Related Changes (See listing) (Agenda Item 7) – Presented by Tiffany Pocock.

Tiffany presented the change as follows:

- Tiffany said she would be discussing the ST's which are her item but also mention some information for Shawn's BA drawings. Tiffany gave some background on the release of the Roadway Design Manual that was published last year. She said that there was a planned update for 2019. These updates would include the ST drawings and the BA drawings Shawn is presenting. Tiffany went over where to find the RDM while George displayed how to find it on the screens. She also went over the numbering scheme for the RDM drawings for informational purposes.

- We have removed the designer information from the ST drawings, similar to how we removed the entire DD drawing series last year. We had enough material in the ST's that needed to remain in the Standard Drawing set that there are now three ST drawings that are all revised to combine the left over information from the other deletions. She mentioned that the Design Group worked heavily with FHWA and the Traffic and Safety Group on all these changes.

Discussion points were:

- Fred asked when all of the RDM changes go live in relation to the Standards meeting. If these changes are approved for the deletion of the

ST drawings, when are they available in the RDM? Brad quickly outlined when the August Standards changes would be published and when they were required for use. Fred said that he believes these changes need to be made available as soon as the deletions are published. Brad said that would be two weeks from today.

- Kris asked if that would be a problem to have them published in two weeks. Tiffany was reluctant to release them that quickly because she wants to release her full 2019 update and some items that are not related to the Standards Committee are not quite ready. She said that the drawings were already on the RDM site as draft versions. Fred and Kris asked if she could just republish those versions without the Draft watermark. After a little more discussion while using the RDM on screen, it was concluded that the new drawings could be there in two weeks.

- Kris asked Tiffany if she had anything else. She mentioned that the AGC still has concerns with having to look in two places for this information. She said that she was told that Robert Stewart was going to call Betty and talk to her about this. Betty said that he did but she is still concerned that this is going to cause delays because the designs they receive in the field are never complete. And without this information in the Standard Drawings they are prevented from designing solutions in the field, there will be 2-6 week delays waiting for solutions from the design group and those kind of delays cost a lot on projects. Fred said that the information is still available, it is just in a different place. Betty said that they already deal with too many references to other documents. She feels like we are making it too difficult to find the information they need by making contractors go to multiple references, rather than having all the information in one place. She said it is going to lead to problems.

- There was no further discussion.

Motion: Fred Doehring made a motion to approve the agenda item as presented. Seconded by Ken Talbot. Passed unanimously.

8. Standard Specifications, Materials Related (see listing) (Agenda Item 8) – Presented by Scott Andrus.

Scott presented the change as follows:

- Previously we presented the idea of the Authorized Products List (APL) and we had hoped to keep it only in 01455 but that idea didn't work. We are bringing the idea back to add the (APL) as the required method of approval for designated materials as identified in the applicable technical specifications but after a lot of comments, many of the proposed specifications have been pulled back out of this agenda item. The idea

behind the APL is to reduce the paperwork currently required for those manufactured products covered by the change making for a more efficient process as well as subjecting those items to a more comprehensive review of qualifications. We have also done a lot of clean up and reordering in 01455.

We have also created a new Standard Specification, 01457, to be placed in the General Specifications to handle the Aggregate Source requirements related to permits for use, maintenance, and clean up formerly covered in 01455.

- We received a lot of good feedback from James Corney and Ken Talbot and we feel we addressed all of those issues. We received a couple of comments late about some reorganization and rewording and we like those comments and would like to present them here for approval. George brought those proposals up on screen. Scott said this rewording streamlines what is stated there now. The other suggestion strikes what is written and tells the contractor which form to fill out. Scott had George bring up the form in question on screen for reference.

- Scott said that they have an APL committee that reviews all of these products and that by getting the APL into the Standards they can gather data and begin incorporating it into other technical specs moving forward. He said the APL committee is comprised of people from many disciplines. They are there to help determine risk as well.

Discussion points were:

- Kris asked Scott where in the spec it tells someone who wants to use a product not on the APL what the process is. Scott said that the intent is that if the technical spec calls out the APL, then only products on the APL can be used and there isn't a process to use anything else. This is going to require that people get their products on the List before a project begins if they want to use it. He said it will be important for us to get the word out the AGC and the industry that this change is taking place. Rick wanted to make sure he understood correctly and asked for clarification, saying that unless it's on the APL it can't be used. Scott said he was correct.

- Kris asked George to pull up 01455 on screen. Everyone read over what Scott was referencing. Cheryl said that they had a lot of discussion about this in Structures and said that they have set up the framework more clearly, but that for a lot of the technical specifications there weren't enough products on the APL so they asked for their specs to be pulled. She said that moving forward the question will need to be asked for each technical specification, do you want to limit it to the APL or not? Each technical spec will need to call out the APL specifically, otherwise there

are other ways for products to be approved within the parameters of the individual technical specifications.

- Betty and Cheryl both expressed concern for some of the ways the APL will work and how it may effect what products can be used and the period for approved products to be used. Cheryl also expressed concern if a manufacturer updates their products.

- Scott said that the APL gives us a better approval process. It helps verify that products are what UDOT wants to use. Scott and Tim went over a little bit of the approval process and expiration dates. Kris asked how often the APL group meets. Tim said monthly if needed. Tim said that they believed that they could cut it down to ten to fifteen days. There were a few people in the room who disagreed that it could be done that quickly because not every group has dedicated people who only review the products.

- Rick asked if they planned on going back to all the technical specs to incorporate the APL. Scott said they planned on going back through them one at time and meeting with the owners to determine if the APL is the right course for that spec.

- Rick asked if there was a minimum on the APL, for example does there need to be three products for each spec on the APL? Or can there be just one product and the project is forced to use only that product. Tim said that there isn't a current requirement for that. Rick was concerned about a monopoly situation where a vendor could jack up their prices because they are the only product on the list. Rick said there should be a requirement that a technical spec has to have at least three products before you can require APL use.

- James said that the 02755 doesn't have any products listed on the APL for one of the tasks called out and it should be pulled from consideration. Kris asked George to pull up the APL so we could look. Tim and Scott used the opportunity to give everyone a quick on screen tour of the APL.

Motion: Brett Slater made a motion to approve with presented modifications and the removal of 02755 from consideration. Seconded by Rick Torgerson. Approved unanimously.

9. Standard Specification and Drawings, ATMS Related (see listing) (Agenda Item 9) – Presented by Michael Adams.

Mike presented the change as follows:

- The ATMS Traffic Surveillance System analog cameras are swiftly becoming obsolete to the surveillance camera industry and require updating. The AXIS IP CCTV is an Internet Protocol based system that will replace the Pelco Espirit and Vicon Dome CCTVs.

  As a result, the Traffic Maintenance Division is introducing 2 new Standard Drawings AT 10A, AT 10B and revising AT 11A to show the new AXIS IP CCTV Camera and the wiring diagram to support the installation. We are also deleting Standard Drawings AT10C, AT10D and AT10E because they depict our older, obsolete CCTV systems.
  13556M is needed to supplement the change from the analog CCTV cameras to the new AXIS IP CCTV camera.
  AT 11B is being revised to accommodate the changes required by newer versions of the Non-Intrusive Detectors themselves.

Discussion points were:

- Kris asked if they worked through the system for using a sole source type of camera. Mike said he wasn't directly involved as he normally is. Procurement used a different method. They tested cameras and they bid the camera out. It was picked based on the fact that it was mountable using either method they use. Kris asked if all cameras were state furnished. Mike said they were. Mike said it was done through a RFP. Kris said he wanted to make sure we weren't requiring contractors to purchase the cameras for us, but as they are state furnished there isn't a concern.

- There was no further discussion.

Motion: Fred Doehring made a motion to approve the agenda item as presented. Seconded by Robert Miles. Approved unanimously.

10. Review of Assignment/Action Log

- Kris made the following assignments:
  Bill Lawrence and Scott Andrus to work on APL and Expiration Date. The duration for review and technical specs.
  Shawn Debenham: Work on BA 1E Standard Drawings
  Justin Wilstead: Work on TC 6 Series Standard Drawings

- Kris wanted to talk about colored drawings: Because we have gone paperless, we have the ability to show color in our drawings. It was brought to my attention that for people who are color blind, they have difficulty seeing the detail. Kris said that as he thought about it, this is a ADA Title VI issue. It was decided that all of our PDF drawings for review and for signature and publishing will be in black and white.

- Kris also brought up Shawn's barrier drawings. Over 40 of them when out for this meeting and it is just too many for people to be able to review. How do we want to handle the rest of them. Shawn went over how many he had left. Kris said, let's limit how many you bring. If it is MASH critical, then you bring them. But for the removal of design notes, maybe bring 15-20 at a time. We don't want to miss anything. Kris said that Shawn should work with George and Brad and if we have a feel that it is a smaller meeting, we can increase how many you bring. Shawn said he would wait for spring for the design items and bring his MASH critical items for October.

11. Other Business:

A. Editorial Change Recap.

B. Next Standards Edition

No additional items.

There was no further discussion or other business.

A motion was made by Fred Doehring, seconded by Rick Torgerson, and approved unanimously to adjourn.

The next regular meeting of the Standards Committee was scheduled for October 31, 2019, at 8:30 a.m., in the Redwood A conference room of the Rampton Complex.

Regular Assignment/Action Item Log				
Date Initiated/Updated	Action	Assignments	Status	Target Date
August 30, 2018	Design Drawing Committee to continue removing design information from drawings	Tiffany Pocock	Open	Ongoing
February 22, 2018	Electronic Book/App	George Lukes/Brad Yeates	Open	Ongoing
June 27, 2019	01355M Environmental Compliance – Stormwater related material/Sweepings	Rod Hess	Open	Ongoing
August 29, 2019	BA 1E Standard Drawing	Shawn Debenham	Open	Went out for review for October, but pulled after comments for further work.
August 29, 2019	TC 6 Series Standard Drawings	Justin Wilstead	Open	On October Agenda
August 29, 2019	Authorized Products List – Work on Expiration Date and duration time for review/tech specs.	Bill Lawrence/Scott Andrus	Open	Ongoing

Regular Closed Items From Last Meeting

Date Initiated/Updated	Action	Assignments	Status	Target Date

Standards Committee Agenda Items Section

Submittal Sheets, Comment Forms, Supplemental Specification Drafts, Supplemental Drawing Drafts, and other supporting data as required for the October 31, 2019 Standards Committee meeting follows this page.

Standards Committee Submittal Sheet

Name of Preparer: **Jesse Sweeten**

Title/Position of Preparer: **Traffic Signal Engineer**

Specification/Drawing/Item Title: **Electrical Power**

Specification/Drawing Number: **Section 16530**

Priority Level (see last page for explanation) **Three**

Completion of paragraphs A, F, and G are mandatory. Lack of information or insufficient information will result in rejection of agenda item.

NOTES:

1. All Submittal Sheets must be completed and sent to the Standards Section by meeting the applicable Coordination due date. (See https://www.udot.utah.gov/StandardsCommitteeScheduleDates)
2. The Preparer of the Submittal Sheet or the Standards Committee member (or authorized substitute) responsible for the submittal must be present at the Standards Committee or Modified Process meeting and capable of discussing and answering all questions related to the submittal. The item will be postponed to a later meeting if one of these people is not present.
3. Notify the Standards Section immediately of any changes that impact the presentation to include absence of sponsor or delay in presentation.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard or what has caused a new or changed item of interest. **(MANDATORY)**

These changes to Standard Specification 16530 are to help bring consistency across the Signal, ATMS, and Electrical Power specifications. Certain equipment and wiring types have been updated. The changes will also provide instructional clarity, address feedback from the field, and reflect current practices.

-Delete Article 2.8, subparagraph A3 and replace with information regarding enclosure rating.

-Delete Article 2.8, subparagraph B3 and replace with information regarding enclosure rating.

-Delete Article 2.8, subparagraph C4 and replace with information regarding enclosure rating

-Delete Article 2.9, subparagraph A3 and replace with information regarding enclosure rating.

-Delete Article 2.10, paragraph C and replace with information regarding enclosure.

-Delete Article 2.10, paragraph D and replace with information regarding insulation class.

-Delete Article 2.13 and replace with updates regarding the Traffic Signal Electrical Service.

B. Measurement, Payment, Acceptance, and Documentation:

1. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.
No Change

2. How is Acceptance and Documentation handled? Existing (from the acceptance and documentation document), modified, or new acceptance and documentation to be included with all Standard Specifications or Supplemental Specifications. Include Contractor Submittals, Inspection Elements, and Documentation.
No Change

C. Stakeholder Notification for AGC and ACEC:

Provide by e-mail, the AGC and ACEC Standards Committee member a copy of all pertinent information relating to the specification or drawing. Detail all responses on the Standards Committee Review Comments Form.

Note: There is a two-week response time set for this item.

Refer to the Standards Committee Web site, http://www.udot.utah.gov/go/standardscommittee to “Standards Committee Members” for the respective e-mail addresses.

AGC: (Document comments on the Comment Form)

ACEC: (Document comments on the Comment Form)

D. Stakeholders:
Document the stakeholders contacted on the Standards Committee Review Comments Form, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change. Stakeholders:

Note: There is a two-week response time set for this item to allow Stakeholders time to process and respond to coordination requests. All areas should try to complete review and comment as soon as possible but within two weeks. Advise Stakeholder if less time is given the Stakeholder to complete this requirement.

Contact all applicable UDOT personnel, FHWA representative for the type item being reviewed, contractors and consultants contacted in addition to those contacted in paragraph "C" above, suppliers, manufacturers and any others as deemed appropriate. Include all those contacted on the Standards Committee Review Comments Form.

FHWA (Accomplished as part of the two-week process before submitting to the Standards section for inclusion on the Standards Committee agenda.) This is in addition to the requirements of UDOT Policy 08A5-01, procedure 08A5-01.3.

E. Other impacted areas, systems, or personnel. Consider all impacts and possible changes to these areas during the preparation process. Coordinate with all appropriate areas for the respective item. List all impacts and action taken.

1. Minimum Sampling and Testing Requirements
No Change

2. Business Systems (Electronic Bid System, Project Development Business System, Electronic Program Management, Computer-Aided Drafting and Design, etc.)
No Change

3. Implementation Plan (Provide detailed instructions on how the subject item will be implemented to include notification of all interested parties and training requirements.) **E-mail notice will be sent as part of the Standards Section's publishing process.**

4. What additional systems and documents need modification to reflect this change?
No modifications needed.

F. Costs? (Estimates are acceptable.) **(MANDATORY)**

1. Cost Impact to the Department (For example, unit bid price, change in quantity, total scope impacts in year, increase in contractor's overhead or mobilization).
   Costs will remain the same. Components to the electrical service will be changed/updated, but major increases or decreases in cost are not expected.

2. Operational (For example, maintenance, materials, equipment, labor, administrative, programming).
   Operational costs are expected to remain the same.

3. Life cycle cost.
   There are no expected increases in life cycle cost.

G. Benefits? Provide details that can be used to complete a Cost – Benefit Analysis. Estimates are acceptable. What is the benefit of making this change if no cost is involved? **(MANDATORY)**
The benefit of these changes would be to help bring consistency across the Signal, ATMS, and Electrical Power specifications. Certain equipment and wiring types have been updated. The changes will also provide instructional clarity, address feedback from the field, and reflect current practices.

H. Safety Impacts?
Not applicable

I. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.
Not applicable. Already covered above.

Timestamp	Email Address	REVIEWER	DRAWING #, SECTION #, ARTICLE #, ETC.	COMMENT	RESPONSE	RESPONSE BY
9/18/2019 13:25	gsearle@utah.gov	Greg Searle	16530	No Comments	-	-
9/18/2019 15:55:03	kthornock@utah.gov	Kirk Thornock	16530	No Comments	-	-
9/19/2019 7:47:46	fdoehring@utah.gov	Fred Doehring	All	Question for the Committee; There seems to be a lot of changes here. Would it be better to re-issue the entire spec rather than issue a Modification? It seems like it would be easier for field staff to have this all in one place.	The proposed changes will be submitted as a re-issue of the entire spec.	Jesse Sweeten
9/19/2019 14:53:31	michellepage@utah.gov	Michelle Page	2.13 C. 3.	For consistency with revisions made to 2.8-2.10, should this include 4X? And should cabinet by enclosure, or define enclosure to be a cabinet? Also, should rainproof be changed to weatherproof or weather resistant?	4X removed. Changed "cabinet" to say "enclosure" throughout spec. Changed to say "weatherproof" instead of "rainproof.	Jesse Sweeten
9/20/2019 17:08:18	michaeladams@utah.gov	Michael A. Adams	16530M	Article 2.8 Paragraphs A3, B3 and C4 - Delete reference to NEMA 250 Type 4X and just use Type 3R only. The contractor won't spend extra money on the Type 4X if he has a choice to go to the cheaper Type 3R. Additionally, on Std. Dwg. AT 9 the NEMA Type 3R is called for in the notes.	Deleted reference to NEMA 250 Type 4X.	Jesse Sweeten
9/23/2019 9:06:08	kbarrett@utah.gov	Kelly Barrett	16530	No Comment	-	-
9/23/2019 16:38:07	mcrasmussen@utah.gov	Marjorie Rasmussen	None	No Comments	-	-
9/24/2019 13:42:58	jcorney@utah.gov	James Corney	1.2 A, 2.3 D, 3.5 F2a	Delete reference to 02892: Traffic Signal. Pay item 165307000 includes the costs to provide electrical service to ATMS devices. It does not include the cost of the Traffic Signals which are covered by Section 02892. The references between sections are made for the determination of work for pay. Refer to 01282 1.6A1 "Payment for a pay item includes payment for work specified in the Section defining the work for that pay item including the work in referenced Sections."	Deleted reference to Spec 02892: Traffic Signal.	Jesse Sweeten
9/24/2019 13:43:16	jcorney@utah.gov	James Corney	2.13 A	Comment Removed at request of Commenter	Comment Removed	Brad Yeates
9/24/2019 13:43:31	jcorney@utah.gov	James Corney	2.13 C1 & 2	Consider revising to: 1. Provide pedestals to the following limiting dimensions a. Pedestal height: 54 inch maximum b. Pedestal width, for dual meter pedestals: 24 inch minimum	Change made.	Jesse Sweeten
9/24/2019 13:44:04	jcorney@utah.gov	James Corney	2.13 C4	Start paragraph with "Provide"	Change made.	Jesse Sweeten
9/24/2019 13:44:20	jcorney@utah.gov	James Corney	2.13 C10	Rephrase: "Mechanically fasten permanent etched or engraved labels to the cabinet."	Change made.	Jesse Sweeten
9/24/2019 13:44:37	jcorney@utah.gov	James Corney	2.13 C12, 2.13 D6e	What does "optional" refer to? Is this an "At contractor's option" thing or a "when shown" thing or an option A vs B thing or an owner's preference that costs more than the base model thing?	This is if shown on the plans. Changed wording to reflect this. The newer signal control cabinets have a generator plug, so these are generally not needed. However, the plug option may be desired in the event of a knockdown at an older signal or if the pedestal needs upgrading, but signal cabinet is newer and does not have the plug option.	Jesse Sweeten
9/24/2019 13:44:58	jcorney@utah.gov	James Corney	2.13 C13	Rephrase: "Attach documentation permanently and conveniently to..."	Change made.	Jesse Sweeten
9/24/2019 13:45:13	jcorney@utah.gov	James Corney	2.13 D3	Start paragraph with "Provide"	Change made.	Jesse Sweeten
9/26/2019 13:36:44	jtremaine@utah.gov	Janice Tremaine	16530M Electrical Power Sup	No comment	-	-
9/26/2019 18:11:32	branden@utah.gov	Branden Anderson	16530M	No Comment	-	-
9/27/2019 11:55:03	rarnell@utah.gov	Rhett Arnell	16530M	No Comment	-	-
9/27/2019 17:39:47	kentalbot@utah.gov	Ken Talbot	2.13 B	What is the product being referred to here that is to be provided?	Changed to: B. Provide underground service pedestal manufactured by one of the following:"	Jesse Sweeten
9/27/2019 17:41:52	kentalbot@utah.gov	Ken Talbot	2.13 C.10	Regarding "Adhesives are not acceptable", is there a preferred method of attaching the labels that should be stated?	Rephrased. Preference is to mechanically fasten labels by etching or engraving to cabinet.	Jesse Sweeten
9/30/2019 9:00:40	dpage@utah.gov	Danny Page	16530M	No Comments	-	-
9/30/2019 9:21:29	shawnlambert@utah.gov	Shawn Lambert	16530	No Comments	-	-
9/30/2019 10:21:56	brettslater@utah.gov	Brett Slater	16530 M	No comment	-	-
10/1/2019 7:21:50	GBLACKWELDER@utah.gov	Glenn Blackwelder	all	No comments	-	-

10/2/2019 21:32:18	raycook@utah.gov	Ray Cook	General	This specification was extremely difficult to review because of the way tracked changes was done. Tracked changes should only reflect the changes actually made. As a favor to reviewers, instead of deleting a large amount of text and then adding it back with a few minor edits, please just show the minor edits as changes.	The entire single meter specification was deleted. The single meter was then made a part of the dual-meter pedestal section which already had all of the required language. We will look for a better way to demonstrate the change in future specification edits.	Jesse Sweeten
10/2/2019 21:33:45	raycook@utah.gov	Ray Cook	Instructional statements	A3, B3, C4, etc. are subparagraphs, not paragraphs. Recommend using the statement “Delete Subparagaph 2.8 A3 and replace with the following:” an option shown in the spec writers guide.	Changed to say subparagraphs.	Jesse Sweeten
10/2/2019 21:37:15	raycook@utah.gov	Ray Cook	1.2A, 2.3 D, 3.5 F2a	1.2 A, 2.3 D, 3.5 F2a: Delete references to 02892. They are unnecessary. Pay items for traffic signal items reference 02892. 02892 references 16530 for electrical power items. Referring back to 02892 is redundant and confusing, particularly when the item being referenced doesn't exist in 02892.	Deleted reference to Spec 02892: Traffic Signal.	Jesse Sweeten
10/2/2019 21:39:02	raycook@utah.gov	Ray Cook	2.8 A3, 2.8 B3, 2.8 C4, 2.9 A3, 2.10 C, 2.10 D	2.8 A3, 2.8 B3, 2.8 C4, 2.9 A3, 2.10 C, 2.10 D: Confirm that “stainless steel” was intentionally deleted.	Yes, these were intentionally deleted.	Jesse Sweeten
10/2/2019 21:40:11	raycook@utah.gov	Ray Cook	2.13	2.13: Coordinate with SL 4C. Use the same terms throughout the drawings and specifications to be clear what the item is. Since reference is made to SL-series drawings and not SL 4C, this is essential. For example, SL 4C is for Underground Service Pedestals. Even the cabinet is labelled in the details as the underground service pedestal. The revised 16530, 2.13 has completely removed the term “underground service pedestal” which will add confusion. There is also duplication between the drawing and the spec. In some cases, the requirements are slightly different which can introduce conflicts. Revise accordingly.	Terms and naming conventions will be updated here and changes to the standard drawings will be done in the future to resolve conflicts. The cabinet is part of the pedestal, i.e. the whole thing is a pedestal, and the cabinet is what contains all the componenets of the pedestal. NEMA refers to it as a "3R rated enclosure". Changed spec to say "enclosure" if it's referring only to the cabinet part.	Jesse Sweeten
10/2/2019 21:41:01	raycook@utah.gov	Ray Cook	2.13	2.13: Subparagraphs of the same level are inconsistent. For example, C1 through C13 should all begin with a verb or none should. Some subparagraphs lack proper grammar and punctuation making the requirements unclear.	Paragraphs, subparagraphs, and sentences revised.	Jesse Sweeten
10/2/2019 21:42:18	raycook@utah.gov	Ray Cook	2.13 C4	2.13 C4: Verify stainless steel requirement. There is no 306 stainless steel. Perhaps, 316 was intended.	The current pedestal contract calls for anodized aluminum. Deleted stainless steel reference. (Both Milbank & Myers have 0.125" aluminum.	Jesse Sweeten
10/2/2019 21:44:32	raycook@utah.gov	Ray Cook	2.13 C5	2.13 C5: Reword. Varmints are not insects.	Sentence reworded.	Jesse Sweeten
10/3/2019 15:01:08	mcrasmussen@utah.gov	Marjorie Rasmussen	Specification 16530	No comments	-	-
10/4/2019 13:09:55	dfriant@utah.gov	Daryl Friant	16530	No Comments	-	-
10/7/2019 16:30:47	dlahusen@avenueconsultants.com	ACEC	16530	No Comment	-	-
10/9/2019 7:09:46	russell.robertson@dot.gov	Russ Robertson	16530	No comments.	-	-

Supplemental Specification
2017 Standard Specification Book

SECTION 16530

ELECTRICAL POWER

Delete Section 16530 in its entirety and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Electrical power conduit, conductors, and equipment for electrical services and feeders.

1.2 RELATED SECTIONS Not Used

1.3 REFERENCES

A. ASTM B 3: Soft or Annealed Copper Wire

B. ASTM B 8: Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

C. ASTM B 496: Compact Round Concentric-Lay-Stranded Copper Conductors

D. ASTM B 800: 8000 Series Aluminum Alloy Wire for Electrical Purposes—Annealed and Intermediate Tempers

E. ASTM B 801: Concentric-Lay-Stranded Conductors of 8000 Series Aluminum Alloy for Subsequent Covering or Insulation

F. ASTM D 92: Test Method for Flash and Fire Points by Cleveland Open Cup Tester

G. ASTM D 2241: Poly Vinyl Chloride (PVC) Pressure-Rated Pipe (SDR Series)

H. ASTM D 2247: Practice for Testing Water Resistance of Coatings in 100 Percent Relative Humidity

I. ASTM F 2160: Solid Wall High Density Polyethylene (HDPE) Conduit Based on Controlled Outside Diameter (OD)

J. American National Standards Institute (ANSI)

K. American Wire Gauge (AWG)

L. Association of Edison Illuminating Companies (AEIC)

M. Electric Utility Service Equipment Requirements Committee (EUSERC)

N. Institute of Electrical and Electronics Engineers (IEEE)

O. Insulated Cable Engineers Association (ICEA)

P. Intertek Electrical Testing Labs (ETL)

Q. National Electric Code (NEC)

R. National Electrical Contractors Association (NECA)

S. National Electrical Manufacturers Association (NEMA)

T. National Fire Protection Association (NFPA)

U. State of Utah Administrative Rule R930-7 – Accommodation of Utilities and the Control and Protection of State Highway Rights of Way

V. Underwriters Laboratories (UL)

W. Western Underground Committee Guides

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

A. Manufacturer's product data sheets and installation instructions for the following products:
   1. Conduit
   2. Power and grounding conductors
   3. Disconnect switches
   4. Panelboards
   5. Dry type transformers
   6. Pad mounted oil filled transformers
   7. Electrical service equipment
   8. Medium voltage cables
   9. Medium voltage terminations

B. Test results. Refer to this Section, Article 3.8.

C. Manufacturer's warranties and guarantees before substantial completion.

1.6 QUALITY ASSURANCE

A. Electrical components must be listed and labeled as defined in the NEC by a nationally recognized testing agency and must be marked for intended use.

B. A Master or Journeyman Electrician licensed in the State of Utah must supervise and be responsible for all onsite work related to this Section.

C. Comply with NFPA 70 (NEC).

PART 2 PRODUCTS

2.1 CONDUCTORS RATED 600 V AND LESS

A. Material: Stranded copper unless stranded aluminum conductors are specifically identified.
   1. Copper: Single conductor, soft drawn complying with NEMA WC70/IECA S-95-658, ASTM B 3 and ASTM B 8.
   2. Aluminum: Series 8000, single conductor complying with NEMA WC70/IECA S-95-658, ASTM B 800 and ASTM B 801.
      a. Do not use aluminum conductors in any traffic signal circuits.

B. Insulation: 90 degrees C, wet location, cross linked polyethylene, USE-2/RHW-2; resistant to oil, gasoline and sunlight.

C. Provide conductor sizes as shown with the following minimum sizes:
   1. 10 AWG copper conductor.
   2. 6 AWG aluminum conductor.

2.2 MEDIUM VOLTAGE CABLES

A. Cable type: MV105 complying with UL 1072, AEIC CS 8, NEMA WC74/ICEA S-93-639, ICEA S-97-682, ASTM B 8 and ASTM B 496.

B. Conductor material: stranded copper, compact round, concentric lay, Class B.

C. Insulation: Ethylene-propylene rubber with the following characteristics:
   1. 5kV or 15kV voltage rating as shown
   2. 133 percent insulation level

3. Ethylene content of the elastomer used in the insulation compound not exceeding 72 percent by weight
4. Polyethylene free insulation compound
5. 5-mil copper tape shielding helically applied over semiconducting insulation shield with minimum 12.5 percent overlap wrap
6. Sunlight-resistant PVC cable jacket

2.3 GROUNDING CONDUCTORS

A. Material: Stranded copper unless stranded aluminum conductors are specifically identified.
   1. Copper: Single conductor, soft drawn complying with NEMA WC70/IECA S-95-658, ASTM B 3 and ASTM B 8.
   2. Aluminum: Series 8000, single conductor complying with NEMA WC70/IECA S-95-658, ASTM B 800 and ASTM B 801.
      a. Do not use aluminum conductors in any traffic signal circuits.

B. Insulation: 90 degrees C, wet location, cross linked polyethylene, USE-2/RHW-2; resistant to oil, gasoline and sunlight.

C. Provide conductor sizes as shown with the following minimum sizes:
   1. 10 AWG copper conductor.
   2. 6 AWG aluminum conductor.

2.4 GROUND RODS

A. Provide copper clad steel ground rods of 3/4 inch diameter by 10 ft long.
   1. Ground Rod Clamps: Bridgeport IGBC075 or equivalent.

2.5 CONDUIT

A. Schedule 40 PVC, type EPC-40, rated for use with 90 degrees C conductors. Comply with NEMA TC-2, ASTM D 2241, UL 651 Listed.
   1. Fittings complying with NEMA TC-3.

B. Schedule 80 PVC, type EPC-80, 90 degrees C rated. Comply with NEMA TC-2, ASTM D 2241, UL 651 Listed.
   1. Fittings complying with NEMA TC-3.

C. Schedule 40 High Density Polyethylene (HDPE), type EPEC-40, smoothwall, 90 degrees C rated. Comply with ASTM D 2247, ASTM F 2160, NEMA TC-7; Intertek ETL Listed to UL 651.

D. Schedule 80 High Density Polyethylene (HDPE), type EPEC-80, smoothwall, 90 degrees C rated. Comply with ASTM D 2247, ASTM F 2160, NEMA TC-7; Intertek ETL listed to UL 651.

E. Rigid Metal Conduit (RMC) complying with UL-6. Zinc galvanized exterior coating complying with ANSI C80.1.

F. Liquidtight Flexible Metal Conduit (LFMC), -30 degrees C to 80 degrees C rated, UL 360 listed.

G. Liquidtight Flexible Nonmetallic Conduit (LFNC), 80 degrees C dry, 60 degrees C wet rated, sunlight resistant, UL 1660 listed.

2.6 TERMINATION CONNECTIONS

A. Wet location connectors
   1. Supply multiport submersible connectors.
      a. Ethylene propylene diene monomer rubber insulated, AL/CU and submersion rated.
      b. Tested to ANSI 119.1, ANSI 119.4 and Western Underground Committee Guide 2.5.
      c. Port quantity and conductor size range matching requirements at each application location.
   2. Heat shrink tubing: Thick wall polyolefin tubing with factory applied heat activated adhesive, 3:1 shrink ratio, UL 486D listed.

B. Dry location connectors
   1. Twist on type wire connectors listed to UL 486C may be used on AWG 8 and smaller conductors.
   2. Insulated multiport mechanical connectors.
      a. Aluminum alloy connector block rated AL/CU with port quantity and entry configuration to match location requirements.
   3. Vinyl electrical tape: 8.5 mil, UL 510 listed vinyl electrical tape.

2.7 MEDIUM VOLTAGE TERMINATIONS

A. Solid terminations: Comply with the following classes of IEEE 48. Insulation class is equivalent to that of cable.
   1. Include shield ground strap for shielded cable terminations.
   2. Class 1 terminations: modular type, furnished as a kit, with stress-relief tube; multiple, molded-silicone rubber, insulator modules; shield ground strap; and compression-type connector.
   3. Class 1 terminations: heat-shrink type with heat-shrink inner stress control and outer nontracking tubes; multiple, molded, nontracking skirt modules; and compression-type connector.
   4. Class 1 terminations: modular type, furnished as a kit, with stress-relief shield terminator; multiple-wet-process, porcelain, insulator modules; shield ground strap; and compression-type connector.

B. Separable insulated connectors: modular system, complying with IEEE 386, with disconnecting, single-pole, cable terminators and with matching, stationary, plug-in, dead-front terminals designed for cable voltage and for sealing against moisture.
   1. Terminations at distribution points: modular type, consisting of terminators installed on cables and modular, dead-front, terminal junctions for interconnecting cables.
   2. Load-break cable terminators: Elbow-type units with 200-A load make/break and continuous-current rating; coordinated with insulation diameter, conductor size, and material of cable being terminated.
      a. Include test point on terminator body that is capacitance coupled.
   3. Dead-Break Cable Terminators: Elbow-type unit with 600-A continuous-current rating; designed for de-energized disconnecting and connecting; coordinated with insulation diameter, conductor size, and material of cable being terminated.
      a. Include test point on terminator body that is capacitance coupled.

2.8 DISCONNECT SWITCHES

A. Fusible switches
   1. Type HD, heavy duty, single throw, UL 98 and NEMA KS 1, with clips or bolt pads to accommodate indicated fuses, lockable handle, and interlocked with cover in closed position.
   2. Internally mounted grounding and insulated neutral buses labeled for copper and aluminum ground conductors.
   3. NEMA 250 Type 3R enclosure rating.
   ~~3. Stainless steel, NEMA 250 Type 4X enclosure rating.~~

B. Nonfusible switches
   1. Type HD, heavy duty, single throw, UL 98 and NEMA KS 1, lockable handle, and interlocked with cover in closed position.
   2. Internally mounted grounding and insulated neutral buses labeled for copper and aluminum ground conductors.
   3. NEMA 250 Type 3R enclosure rating.
   ~~3. Stainless steel, NEMA 250 Type 4X enclosure rating.~~

C. Enclosed Molded Case Circuit Breakers
   1. Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.
   2. Thermal-Magnetic trip unit with inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits.

3. Internally mounted grounding and insulated neutral buses labeled for copper and aluminum ground conductors.
4. NEMA 250 Type 3R enclosure rating.
~~4. Stainless steel, NEMA 250 Type 4X enclosure rating.~~

2.9 PANELBOARDS

A. Feeder and branch circuit panelboards: comply with NEMA PB-1.
1. Phase, neutral, and ground buses made of hard-drawn copper, 98 percent conductivity.
2. Equipment ground bus sized adequately for feeder and branch-circuit equipment grounding conductors; bonded to box.
3. NEMA 250 Type 3R enclosure rating.
~~3. Stainless steel, NEMA 250 Type 4X enclosure rating.~~

B. Main overcurrent protective device: Bolt on molded case circuit breaker, complying with UL 489, NEMA AB 1, and NEMA AB 3, with 10kA minimum interrupting capacity or higher as needed for the available fault current.
1. Thermal-Magnetic trip unit with inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits.

C. Branch circuit overcurrent protective devices: Bolt-on circuit breakers, AL/CU rated, replaceable without disturbing adjacent units.
1. Comply with UL 489, with 10kA minimum interrupting capacity or higher as needed for the available fault current.

2.10 DRY TYPE TRANSFORMERS

A. Comply with NEMA ST 20, listed and label as complying with UL 1561.

B. Coil Material: Resin encapsulated copper or aluminum.

C. Enclosure: NEMA 250 Type 3R, fully enclosed, non-ventilated.
~~C. Enclosure: Stainless steel, NEMA 250 Type 3R or 4X, fully enclosed, non-ventilated~~

D. Insulation Class: 180 degrees C, UL-component-recognized insulation system with a maximum of 115 degrees C rise above 40 degrees C ambient temperature. ~~D. Insulation Class: 220 degrees C, UL-component-recognized insulation system with a maximum of 115 degrees C rise above 40 degrees C ambient temperature~~

E. Primary and secondary voltage as shown.

2.11 PAD MOUNTED OIL FILLED TRANSFORMER

A. Description: ANSI C57.12.00, ANSI C57.12.13, IEEE C57.12.25, pad-mounted, 2-winding transformers.
   1. Stainless-steel tank base and cabinet.

B. Coil Material: Copper.

C. Insulating Liquid: Less flammable, edible-seed-oil based and UL listed as complying with NFPA 70 requirements for fire point of not less than 300 degrees C when tested according to ASTM D 92.
   1. Biodegradable and nontoxic.

D. Temperature Rise: 65 degrees C when operated at rated kVA output in a 40 degrees C ambient temperature.

E. Basic Impulse Level: 95 kV.

F. Full-Capacity Voltage Taps: Four 2.5 percent taps, 2 above and 2 below rated high voltage; with externally operable tap changer for de-energized use.

G. Equipment support pad – Refer to SL Series Standard Drawings.

2.12 HIGHWAY LIGHTING ELECTRICAL SERVICE

A. General Requirements
   1. Provide product manufactured by one of the following:
      a. Millbank Manufacturing Co.
      b. Myers Power Products
      c. Cooper Industries
      d. Approved equal product.
   2. Metered power pedestal with base, NEMA 3R cabinet with gasket sealed access doors fabricated of 0.120 inch minimum thickness anodized aluminum.
      a. Continuously welded exterior cabinet and door seams with smooth seams and free of any voids.
      b. Design to be bolted down to a concrete foundation or pad from the inside of the pedestal.
   3. Cabinet height 54 inches maximum.
   4. Provide service entrance, meter, and distribution compartments separated by corrosion resistant barrier.
   5. Provide compartment access doors with stainless steel piano hinges with hinges on left as viewed facing the cabinet.
   6. Provide provision for padlock.

7. Design cabinet openings including ventilation holes to prevent entrance of insects such as wasps, hornets, bees, and varmints when access panel and doors are closed.
    a. Install a permanent welded insect screen on ventilation holes.
8. Provide sealed windows made of shatter resistant polycarbonate for photocell operation.
    a. Provide two windows and mounting brackets on opposite sides of the cabinet for the photocell.
    b. Locate the windows on the sides of the cabinet.
9. UL 508 listed.
10. Provide pedestal documentation permanently attached to the inside of the distribution section.
11. Provide interior and exterior labels etched or engraved and mechanically fastened to the cabinet.
    a. Adhesives are not acceptable.
    b. Label front exterior of the cabinet “UDOT LIGHTING DISCONNECT.”
12. Minimum 6 inches of free space between pad and any electrical components for routing conductors.

B. Electrical Requirements
1. Rated for 200 amp, 1-phase, 3-wire, 120/240V or 240/480V service as shown.
    a. 200 amp utility landing lugs rated for copper and aluminum conductors, sized to accommodate up to 250 kCMIL wire.
    b. Self-contained utility watt-hour meter socket with manual link bypass.
        1) Comply with local power utility company requirements.
    c. Bolt on 200-amp, 2-pole main circuit breaker.
    d. 12 circuit panel board interior.
    e. Lighting contactors, electrically held, 30-amp, 2-pole, rated for No. 2 AWG wire.
        1) Provide one contactor per lighting circuit.
    f. Pre-wired photocell socket and 12 year warranty photocell module.
    g. Test switch with Hand-Off-Auto settings.
    h. Circuit terminal bar with lugs rated for wire sizes #6 to #0 AWG.
    i. Grounding terminal bar with lugs rated for #6 AWG wire size, adjacent to circuit terminal bar.
    j. Position circuit and grounding terminal bars to be lowest electrical component and a minimum 12 inches from the cabinet mounting pad.

2. Pre-wired complying with to NEC and NEMA requirements using UL listed copper XHHW-2 or UL listed equivalent cable bussing, fully rated.
3. UL listed, bolt-on circuit breakers, AL/CU labeled, industrial grade.
   a. Rated for available short circuit current with minimum interrupting rating of 10k AIC for 240V and 14k AIC at 480V.
4. Comply with EUSERC requirements for all mounting hardware and installation details.

2.13 TRAFFIC SIGNAL ELECTRICAL SERVICE

~~A. Refer to SL Series Standard Drawings.~~

~~B. Provide product manufactured by one of the following:~~
~~1. Millbank Manufacturing Co.~~
~~2. Myers Power Products~~
~~3. Cooper Industries~~
~~4. Approved equal product.~~

~~C. Single meter underground service pedestal~~
~~1. Service Disconnect:~~
~~a. Provide pedestal rated for 100 amp, 1-Phase 3-wire 120/240V service.~~
~~b. Provide 200 amp utility landing lugs rated for 250 kCMIL wire.~~
~~c. Provide pedestal that is split into an "un-metered" and a "metered" side.~~
~~d. Provide plug in circuit breakers that are UL approved, industrial grade, and rated for 10K AIC minimum or higher as required for available fault current.~~
~~e. Provide one double pole 70 amp main circuit breaker labeled "Metered Main" and one single pole 30 amp circuit breaker labeled "Traffic Signal" with minimum capacity for four metered single pole circuit breakers.~~
~~1) Provide traffic signal circuit breaker that is secondary to the metered main breaker.~~
~~f. Provide cabinet with sealed windows of shatter resistant Lexan or equivalent.~~
~~g. Provide a meter that can be read from the front of the cabinet.~~
~~h. Provide pedestal with service entrance, meter, and distribution compartments with a corrosion resistant barrier to separate each compartment.~~
~~1) Provide access panel or door with stainless steel piano hinges.~~

i. Provide one double pole 50 amp main circuit breaker labeled "Un-metered Main" and one double pole 20 amp circuit breaker labeled "Lighting" with minimum capacity for four un-metered double pole circuit breakers.
1) Provide lighting circuit breaker that is secondary to the un-metered main circuit breaker.

2. Provide pedestal that is pre-wired according to NEC and NEMA specification with UL approved copper XHHW-2 cable bussing, fully rated.
3. Provide provisions for terminating to a ground rod.
4. Provide pedestal with UL 508 rating.
5. Provide self-standing NEMA 3R cabinet (direct burial pedestals are not acceptable) with gasket in place, fabricated of 0.120 inch minimum thickness anodized aluminum.
a. Provide all exterior components that are rust proof.
b. Provide exterior that has no exposed hardware except for handles.
6. Meet EUSERC requirements for all mounting hardware and installation details.
a. Fit with EUSERC approved power meter base with manual link bypass.
7. Provide documentation that is permanently and conveniently attached and includes the manufacturer's name, address, phone number, a wiring diagram, date of manufacture, and all necessary information to order an identical pedestal and replacement parts.
8. Provide labels that are permanently etched or engraved and mechanically fastened to the cabinet.
a. Adhesives are not acceptable.
b. Label the front exterior of the cabinet "UDOT SIGNAL AND LIGHTING DISCONNECT."

D. Dual meter underground service pedestal
1. Pedestal height 54 inches maximum and 24-inch minimum width.
2. Provide rainproof, NEMA 3R cabinet.
3. Cabinet constructed of 0.125 inch anodized aluminum 5052-H32 or 16 gauge #306 stainless steel, continuously welded or overlapped and carriage-bolted exterior and door seams, smooth and free of any voids.
4. Provide two meter sockets, one labeled "SIGNAL" and one labeled "LIGHTING."
5. Design cabinet openings, such as ventilation holes, to prevent entrance of insects such as wasps, hornets, or bees.
a. Install a permanent, welded insect screen over ventilation holes.

6. Provide adequate clearances inside the cabinet for pulling and connecting to service and distribution (field) wiring with conduits extending into the cabinet 2 inches maximum.
7. Provide sealed shatter and UV resistant polycarbonate windows for meter reading and photocell operation.
    a. Meter window on front of pedestal.
    b. Photocell headlight shield that will not affect normal operation nor will harbor nesting insects.
8. Provide service entrance, meter, and distribution compartments with padlockable, vandal-resistant doors and covers, and corrosion resistant barriers separating each compartment.
    a. Design compartments for safety and ease of maintenance.
    b. Hinge access panels and doors with stainless steel piano hinges on access panel or access door.
        1) Place hinges on left side of door when facing the pedestal.
9. Fasten cabinet directly to pad-mount base encased in concrete, with option for attachment to anchor bolts. Secure all mounting bolts from inside the cabinet.
10. Permanent etched or engraved labels mechanically fastened to the cabinet. Adhesives are not acceptable.
    a. Label Exterior of front-door "UDOT SIGNAL AND LIGHTING DISCONNECT."
11. Conform to UL508 Industrial Control Panel Labels for service entrance equipment requirements.
12. Provide 30A, 125VAC, 2-pole, 3-wire, and twist-lock flanged inlet type L5-30P with weatherproof padlockable cover to be used for generator attachment during power outages.
13. Provide documentation permanently and conveniently attached to the inside of the distribution section or a permanently attached interior documentation storage pocket or pouch.
    a. Include the manufacturer's name, address, phone number, a wiring diagram, date of manufacture, and all necessary information to order an identical pedestal and replacement parts in the documentation.
14. Provide single-phase, 3-wire, 120V/240V, 100A service.
15. Utility terminations rated for 200A and lugs sized for 250 kCMIL wire with two self-contained watt-hour meter sockets, main service disconnect, and meter bypass switch.
    a. Meet local power utility company requirements.
    b. Provide adequate space for a meter puller.
16. Electrical components rated for temperatures between -30 degrees F and 130 degrees F.
17. Meet EUSERC requirements for all mounting hardware and installation details.

~~18. Provide plug in circuit breakers that are UL approved, industrial grade, and rated for 10K AIC minimum or higher as required for available fault current.~~

~~19. Metered Signal Side requirements:~~

~~a. Double pole 70-amp main plug-in circuit breaker labeled "Signal Main."~~

~~b. One single-pole 30-amp plug-in circuit breaker labeled "Traffic Signal," secondary to the Signal Main breaker.~~

~~c. Capacity for 4 single pole plug-in circuit breakers, also secondary to Signal Main breaker.~~

~~d. Provide pre-wired 30-amp generator input bypass, rotary cam transfer switch, with exterior generator twistlock plug L5-30P for use during power outage. Label transfer switch settings "LINE" and "GEN." Feed the generator bypass through the signal side of the breaker panel only.~~

~~20. Metered Lighting Side requirements:~~

~~a. Double Pole 70-amp main plug-in circuit breaker labeled "Lighting Main."~~

~~b. Double pole 30-amp (120/240 volt) plug-in circuit breaker labeled "lighting," plus breaker for photo control, both secondary to the Lighting Main breaker.~~

~~c. Pre-wired 30-amp 120V electrically-held 2-pole contactor.~~

~~d. Three-position rotary test switch with "On-Off-Auto" settings, clearly labeled.~~

~~e. Minimum capacity for (4) four double-pole circuit breakers.~~

~~f. Circuit terminal bar with lugs rated for wire sizes 6 AWG to 1/0 AWG, labeled "Lighting Circuit." Grounding terminal bar with lugs rated for 6 AWG to 1/0 AWG wire size, adjacent to circuit terminal bar.~~

~~g. Prewired for photocell.~~

A. Refer to SL Series Standard Drawings.

B. Provide underground service pedestal manufactured by one of the following:

1. Milbank Manufacturing Co.
2. Myers Power Products
3. Cooper Industries
4. Approved equal product.

C. Underground Service Pedestal General Requirements

1. Provide enclosures to the following limiting dimensions.
   a. Enclosure height: 54 inch maximum.
   b. Enclosure width, for dual meter pedestals: 24 inch minimum
3. Provide weatherproof, NEMA 3R enclosure.

4. Provide enclosure constructed of 0.125 inch anodized aluminum 5052-H32 continuously welded or overlapped, including carriage-bolted exterior and door seams, smooth and free of any voids.
5. Design enclosure openings, such as ventilation holes, to prevent entrance of varmints and insects such as wasps, hornets, and bees when access panel and doors are closed.
    a. Install a permanent, welded insect screen over ventilation holes.
6. Provide adequate clearances inside the enclosure for pulling and connecting to service and distribution (field) wiring with conduits extending (2 inches maximum) into the enclosure.
7. Provide sealed shatter-resistant and UV-resistant polycarbonate windows for meter reading and photocell operation.
    a. Equip meter window on front of pedestal.
    b. Equip photocell headlight shield that will not affect normal operation nor will harbor nesting insects.
8. Provide service entrance, meter, and distribution compartments with padlockable, vandal-resistant doors and covers, and corrosion-resistant barriers separating each compartment.
    a. Design compartments for safety and ease of maintenance.
    b. Design hinge access panels and doors with stainless steel piano hinges on access panel or access door.
        1) Place hinges on left side of door when facing the pedestal.
9. Fasten enclosure directly to pad-mount base encased in concrete, with option for attachment to anchor bolts. Secure all mounting bolts from inside the enclosure.
10. Mechanically fasten permanent etched or engraved labels to the enclosure. Adhesives are not acceptable.
    a. Label Exterior of front door “UDOT SIGNAL AND LIGHTING DISCONNECT.”
11. Conform to UL508 Industrial Control Panel Labels for service entrance equipment requirements.
12. Provide generator input inlet as shown.
    a. Equip inlet with 30A, 125VAC, 2-pole, 3-wire, and twist-lock flanged inlet type L5-30P with weatherproof padlockable cover to be used for generator attachment during power outages.
13. Attach documentation permanently and conveniently to the inside of the distribution section or a permanently attached interior documentation storage pocket or pouch.
    a. Include the manufacturer’s name, address, phone number, a wiring diagram, date of manufacture, and all necessary information to order an identical pedestal and replacement parts in the documentation.

D. Electrical Requirements

1. Provide single-phase, 3-wire, 120V/240V, 100A service.
2. Provide utility terminations rated for 200A and lugs sized for 250 kCMIL wire with self-contained watt-hour meter sockets, main service disconnect, and meter bypass switch.
   a. Meet local power utility company requirements.
   b. Provide one meter socket for signal side on single meter pedestals.
   c. Provide two meter sockets – one for signal side and one for lighting side – on dual meter pedestals. Label each socket "SIGNAL" and "LIGHTING" accordingly.
   d. Provide adequate space for a meter puller.
3. Provide electrical components rated for temperatures between -30 degrees F and 130 degrees F.
4. Meet EUSERC requirements for all mounting hardware and installation details.
5. Provide plug in circuit breakers that are UL approved, industrial grade, and rated for 10K AIC minimum or higher as required for available fault current.
6. Meet Signal Side Requirements:
   a. Provide double pole 70-amp main plug-in circuit breaker labeled "Signal Main."
   b. Provide one single-pole 30-amp plug-in circuit breaker labeled "Traffic Signal," secondary to the Signal Main breaker.
   c. Provide capacity for 4 single pole plug-in circuit breakers, also secondary to Signal Main breaker.
   d. Provide surge protection device with status LED: 150 volt MCOV, 10 kA Nominal Discharge Current, 25 kA SCCR.
   e. Provide (if generator input inlet is equipped): Pre-wired 30-amp generator input bypass, rotary cam transfer switch, with exterior generator twistlock plug L5-30P for use during power outage. Label transfer switch settings "LINE" and "GEN." Feed the generator bypass through the signal side of the breaker panel only.
7. Meet Lighting Side Requirements:
   a. Provide double Pole 70-amp main plug-in circuit breaker labeled "Lighting Main."
   b. Provide double pole 30-amp (120/240 volt) plug-in circuit breaker labeled "lighting," plus breaker for photo control, both secondary to the Lighting Main breaker.
   c. Provide pre-wired 30-amp 120V electrically-held 2-pole contactor.

d. Provide three-position rotary test switch with “On-Off-Auto” settings, clearly labeled.
e. Provide minimum capacity for (4) four double-pole circuit breakers.
f. Provide circuit terminal bar with lugs rated for wire sizes 6 AWG to 1/0 AWG, labeled “Lighting Circuit.” Grounding terminal bar with lugs rated for 6 AWG to 1/0 AWG wire size, adjacent to circuit terminal bar.
g. Provide prewired photocell socket with minimum 12-year warranty, long-life photocell.

2.14 ATMS ELECTRICAL SERVICE

A. General Requirements
1. Provide product manufactured by one of the following:
   a. Millbank Manufacturing Co.
   b. Myers Power Products
   c. Cooper Industries
   d. Approved equal product.
2. Metered power pedestal with base, NEMA 3R cabinet with gasket sealed access doors fabricated of 0.120 inch minimum thickness anodized aluminum.
   a. Continuously welded exterior cabinet and door seams with smooth seams and free of any voids.
   b. Design to be bolted down to a concrete foundation or pad from the inside of the pedestal.
3. Cabinet height 54 inches maximum.
4. Provide service entrance, meter, and distribution compartments separated by corrosion resistant barrier.
5. Provide compartment access doors with stainless steel piano hinges.
   a. Hinges on left as viewed facing the cabinet.
6. Provide provision for padlock.
7. Design cabinet openings including ventilation holes to prevent entrance of insects such as wasps, hornets, bees, and varmints when access panel and doors are closed.
   a. Install a permanent welded insect screen on ventilation holes.
8. UL 508 listed.
9. Provide sealed shatter-resistant and UV-resistant polycarbonate windows for meter reading on front of meter pedestal.
10. Provide pedestal documentation permanently attached to the inside of the distribution section.
11. Provide interior and exterior labels etched or engraved and mechanically fastened to the cabinet. Adhesives are not acceptable.

a. Label front exterior of the cabinet “UDOT ATMS DISCONNECT.”

B. Electrical Requirements
1. Rated for 100-amp, 1-phase, 3-wire, 120/240V service.
a. 200 amp utility landing lugs to accommodate up to 250 kCMIL wire rated for copper and aluminum conductors.
b. Main breaker: bolt on 100-amp, 2-pole.
c. 12 circuit panel board interior.
2. Pre-wired complying with NEC and NEMA requirements using UL listed copper XHHW-2 or UL listed equivalent cable bussing, fully rated.
3. Circuit breakers: UL listed, plug-in, AL/CU labeled, industrial grade, and rated for available short circuit current with minimum interrupting rating of 10k AIC at 240V.
4. Meet EUSERC requirements for all mounting hardware and installation details.
5. Fit with EUSERC approved power meter base with manual link bypass.

2.15 CONDUCTOR IDENTIFICATION MATERIALS

A. Colored, 7 mil thickness, self-adhesive vinyl electrical tape complying with UL 510.

B. Polyethylene or weather resistant nylon 6.6 flag or wrap type cable marker.
1. Tag area is markable with manufacturer’s permanent marker or machine printed, laminated label.

PART 3 EXECUTION

3.1 INSTALLATION STANDARDS

A. Comply with NFPA 70 (NEC).

3.2 PREPARATION

A. Comply with local power utility requirements.
   1. Contact power utility at least 60 days before the connection date and verify the exact location, voltage, procedure, and materials required by the power utility.

3.3 TRENCHING AND DIRECTIONAL BORING FOR CONDUIT

A. Trenching Paved Asphalt Surface
   1. Do not use backhoe.
   2. Make the trench 6 inches wide or less.
   3. Use flowable fill to within 3 inches of the existing roadway surface unless otherwise specified.
   4. Apply tack coat evenly before final backfill when placing HMA.
   5. Match the composition, density, and elevation within ± $^{3}/_{16}$ inch of the existing pavement section.

B. Trenching Unpaved Surface
   1. Use backfill that matches the composition, density, and elevation within ± $^{3}/_{16}$ inch of the existing surface.
   2. Install conduits that cross finished curbs and gutters, sidewalks, concrete flatwork, textured or decorative surfaces by jacking, drilling, or pushing.
   3. Dispose of surplus material promptly.

C. Minimum Conduit Cover
   1. Traffic Signals
      a. Refer to SL series standard drawings.
   2. All others
      a. Refer to AT series standard drawings.
      b. Refer to Utah Administrative Rule 930-7

D. Directional Boring
   1. Directional boring is an approved alternative to trenching unless otherwise specified.
   2. Immediately contain, remove, and properly dispose of all drilling fluid outside the bore.

3.4 INSTALL CONDUIT

A. Use rigid metal conduit or Schedule 80 PVC conduit for above ground application.
   1. Liquidtight Flexible Metal Conduit or Liquidtight Flexible Non-Metallic Conduit is permitted in lengths not exceeding 6 ft where not subject to physical damage.
   2. Apply corrosion protection to any portion of rigid metal conduit buried in the ground or encased in concrete.

B. Use PVC or HDPE conduit for underground application.

C. Install a bushing or bell end adapter at ends of all conduit.

D. Seal uncapped conduit ends inside junction box
   1. Conduit 2 inches and smaller: Seal with at least 2 inches of duct caulking or PVC cap.
   2. Conduit larger than 2 inches: Seal with duct plug or PVC cap.

E. Do not use a torch for bending or shaping PVC conduit.
   1. Use equipment specifically designed to heat PVC conduit to shape any required curves or radii.

F. Use couplers specifically designed to couple PVC conduit to HDPE conduit.

G. Install weatherproof junction box with breakaway receptacle or fuse holder at breakaway structures.

H. Do not exceed 270 degrees of conduit sweeps between individual junction boxes.

I. Route conduit entering junction boxes to enter on the narrow side at an angle perpendicular to the box.
   1. Run conduit to the junction box by the most direct route, using the fewest bends possible.

3.5 INSTALL CONDUCTORS

A. Verify conduit is clean, dry, and free of dirt and debris before installing conductors.

B. Use conductor manufacturer approved pulling compound or lubricant where necessary.
   1. Compound used must not deteriorate conductor or insulation.

C. Do not exceed manufacturer's recommended maximum pulling tensions.

D. Install equipment grounding conductor in all conduits.
   1. Copper grounding conductors must run continuously between and be bonded to ground rods in each junction box.
   2. Aluminum grounding conductors must run continuously between junction boxes, and be bonded to the ground rod in each junction box using a 48 inch insulated copper pigtail conductor.
      a. Match copper pigtail gauge to aluminum grounding conductor gauge.

E. Install conductors from source to load in continuous lengths without splicing.

F. Terminate conductors.
   1. Use wet location connectors in wet locations including all underground and in-ground locations,.
   2. Dry location twist type connectors may be used in dry above ground locations.
   3. Do not use vinyl electrical tape as the sole means of insulating a connection or connector.

G. Identify each conductor by circuit, phase, voltage, source and load.
   1. Conductors 6 AWG and smaller must have continuous outer insulation color complying with NEC requirements.
   2. Conductors 4 AWG and larger may be identified by use of colored phase tape at all junction boxes and terminations.
   3. Group all conductors of each circuit using wrap around or flag type cable markers.
      a. Identify source and load location by description and milepost.
      b. Do not use Station Numbers to describe location.

H. Leave 6 ft of slack conductor measured from the opening of each junction box that the conductor passes through.

I. Make aluminum conductor connections in accordance with NECA 104.

J. Neatly arrange and support conductors within cabinets, junction boxes, and fixtures.

3.6 GROUNDING AND BONDING

A. Bond equipment grounding conductors to ground rods, metal equipment enclosures, metal poles and ground busses.
   1. Comply with NEC Article 250 requirements.

B. Bond neutral conductors to metal equipment enclosures and equipment grounding conductors only at electrical service equipment and at transformer secondary terminals and other separately derived systems.
   1. Comply with NEC Article 250 requirements.

C. Install concrete encased electrodes where shown and as required by the NEC. Bond existing concrete encased electrodes such as pole anchor bolts to metal pole or equipment enclosures and equipment grounding conductor.
   1. Concrete encased electrode consists of: Conductive metal in structure foundation encased by at least 2 inches of concrete where foundation is in direct contact with the earth. Use one of the following conductive metal elements:
      a. 4 AWG bare copper conductor, 20 ft minimum length.
      b. Bare or zinc galvanized steel reinforcing bars or anchor bolts, 1/2 inch minimum diameter; 20 ft total length.
         1) Connect lengths of bar together with steel tie wires to meet total length requirement.
         2) Epoxy coated reinforcing bar may not be used as part of the grounding electrode.
      c. No additional conductive metal is required in the concrete foundation where anchor bolts or other conductive metal satisfies requirements above.

D. Install ground rods where shown and as required by the NEC.
   1. Drive ground rods until tops are 2 inches below final grade at services and separately derived systems.
   2. Install ground rod to extend a minimum of 4 inches and a maximum of 6 inches above box floor in junction boxes.
   3. Space ground rods minimum of 6 feet apart where multiple rods are shown or are required by the NEC.
   4. Provide 48 inch copper jumper from ground rod to aluminum equipment grounding conductor.

3.7 INSTALL DISCONNECTS, PANELBOARDS AND TRANSFORMERS

A. Install equipment level and plumb. Securely mount equipment to support frames.

B. Install rain shields and verify drain openings are unblocked.

C. Close and seal any unused openings.

D. Install fuses in fusible devices.

E. Provide and install one-time use locks on all lockable equipment.
   1. Install State furnished padlocks where provided.

3.8 TESTING

A. After installation but before terminating test each conductor for insulation integrity to adjacent conductors and ground using 1000VDC megohmmeter.
   1. Record insulation resistance in megohms after 30 seconds and 60 seconds (R30 and R60).
   2. Calculate polarization index by dividing the 60 second resistance by the 30 second resistance (R60 / R30).
   3. Replace any conductors with a polarization index value less than 1.4.

B. Measure transformer secondary voltage while loaded to final load and record voltage and submit for information.

C. Record insulation test resistance values, polarization index and transformer voltage measurements and submit for information.

END OF SECTION

Standards Committee Submittal Sheet

Name of Preparer: Justin Wilstead

Title/Position of Preparer: Standards and Innovation Manager

Specification/Drawing/Item Title: Temporary Pedestrian Access Route

Specification/Drawing Number: TC 6A, TC 6B, TC 6C, TC 6D

Priority Level (see last page for explanation) 3

Completion of paragraphs A, F, and G are mandatory. Lack of information or insufficient information will result in rejection of agenda item.

NOTES:

1. All Submittal Sheets must be completed and sent to the Standards Section by meeting the applicable Coordination due date. (See https://www.udot.utah.gov/StandardsCommitteeScheduleDates)
2. The Preparer of the Submittal Sheet or the Standards Committee member (or authorized substitute) responsible for the submittal must be present at the Standards Committee or Modified Process meeting and capable of discussing and answering all questions related to the submittal. The item will be postponed to a later meeting if one of these people is not present.
3. Notify the Standards Section immediately of any changes that impact the presentation to include absence of sponsor or delay in presentation.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard or what has caused a new or changed item of interest. **(MANDATORY)**

Proposed TC 6 series drawings will replace the current TC 6 to expand upon/provide additional guidance to route pedestrians through or around a work zone. Updates are consistent with ADA, PROWAG and MUTCD requirements.

B. Measurement, Payment, Acceptance, and Documentation:

1. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.

A new M&P standard item will need to be created to cover Temporary Pedestrian Access Route (TPAR). I will be working with Construction to determine the proper method for measurement (lump, each, etc..).

2. How is Acceptance and Documentation handled? Existing (from the acceptance and documentation document), modified, or new acceptance and documentation to be included with all Standard Specifications or Supplemental Specifications. Include Contractor Submittals, Inspection Elements, and Documentation.

Existing acceptance and documentation still applies.

C. Stakeholder Notification for AGC and ACEC:

Provide by e-mail, the AGC and ACEC Standards Committee member a copy of all pertinent information relating to the specification or drawing. Detail all responses on the Standards Committee Review Comments Form.

Note: There is a two-week response time set for this item.

Refer to the Standards Committee Web site, http://www.udot.utah.gov/go/standardscommittee to "Standards Committee Members" for the respective e-mail addresses.

AGC: (Document comments on the Comment Form)

ACEC: (Document comments on the Comment Form)

D. Stakeholders:
Document the stakeholders contacted on the Standards Committee Review Comments Form, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change.
Stakeholders:

Note: There is a two-week response time set for this item to allow Stakeholders time to process and respond to coordination requests. All areas should try to complete review and comment as soon as possible but within two weeks. Advise Stakeholder if less time is given the Stakeholder to complete this requirement.

Contact all applicable UDOT personnel, FHWA representative for the type item being reviewed, contractors and consultants contacted in addition to those contacted in paragraph “C” above, suppliers, manufacturers and any others as deemed appropriate. Include all those contacted on the Standards Committee Review Comments Form.

FHWA (Accomplished as part of the two-week process before submitting to the Standards section for inclusion on the Standards Committee agenda.) This is in addition to the requirements of UDOT Policy 08A5-01, procedure 08A5-01.3.

E. Other impacted areas, systems, or personnel. Consider all impacts and possible changes to these areas during the preparation process. Coordinate with all appropriate areas for the respective item. List all impacts and action taken.

1. Minimum Sampling and Testing Requirements
   N/A

2. Business Systems (Electronic Bid System, Project Development Business System, Electronic Program Management, Computer-Aided Drafting and Design, etc.)
   N/A

3. Implementation Plan (Provide detailed instructions on how the subject item will be implemented to include notification of all interested parties and training requirements.) **E-mail notice will be sent as part of the Standards Section’s publishing process.**

4. What additional systems and documents need modification to reflect this change?
   N/A

F. Costs? (Estimates are acceptable.) **(MANDATORY)**

1. Cost Impact to the Department (For example, unit bid price, change in quantity, total scope impacts in year, increase in contractor’s overhead or mobilization).

   Proposed updates may have an increase in pedestrian ramp reconstruction bid price due to the need to construct TPAR. This has been a requirement in the standards previously, so ped ramp reconstruction prices should currently reflect cost for TPAR.

   Enforcement of the requirement to provide a TPAR may also result in changes to work phasing in order to maintain pedestrian access.

2. Operational (For example, maintenance, materials, equipment, labor, administrative, programming).

Estimate for material to construct a 100' temporary access route:

- **Barricade with arrow sign - 2 @ $250 EA = $500**
- **Temporary ramp - 2 @ $500 EA = $1,000 (Assumed made of plywood by worker) (ADA self adhesive dome sticker is $160 if needed)**
- **Water barrier - 250' @ $8 FT = $2,000 (Cost to rent water barrier from united rental for 1 week is $7/FT.)**

Total material cost for 100' detour = $3500. This will vary based upon field conditions on each project.

3. Life cycle cost.

It is anticipated that temporary ramps may be reused at different locations. Depending upon the type/material of the temp ramp that is constructed or procured, the life cycle will differ.

G. Benefits? Provide details that can be used to complete a Cost – Benefit Analysis. Estimates are acceptable. What is the benefit of making this change if no cost is involved? **(MANDATORY)**

Proposed drawings will provide guidance to construct a TPAR. It will also help construction management teams enforce the current ADA/PROWAG requirements that are in the TC series standard drawings and 01554.

H. Safety Impacts?

Proposed drawings will increase safety by providing additional guidance for routing pedestrians in the work zone during construction.

I. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

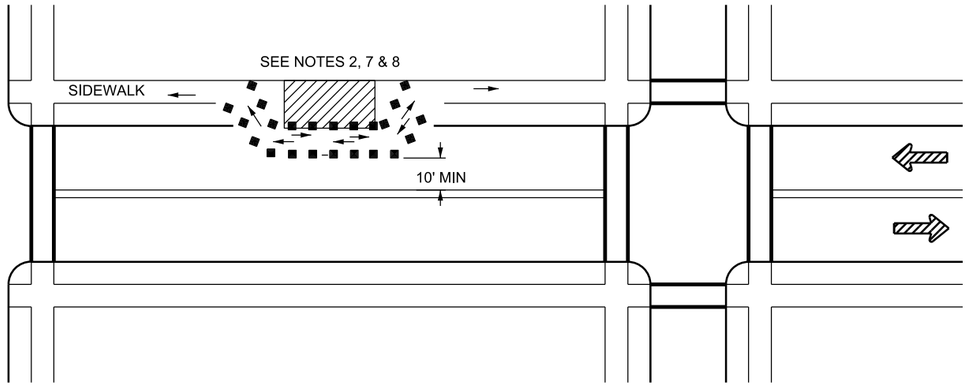
Feedback from the construction crews during the FHWA stewardship work zone reviews has shown that there is a need to clarify the intent of routing pedestrians in work zones. Improvements have been made over the past few years, but it is clear that there is a need to provide additional guidance in order to provide the construction crews the tools needed to enforce what the standard drawings and specifications are currently requiring.

Timestamp	Email Address	REVIEWER	DRAWING #, SECTION #, ARTICLE #, ETC.	COMMENT	RESPONSE	RESPONSE BY
9/18/2019 15:59:08	kthornock@utah.gov	Kirk Thornock	TC6	No comments		
9/19/2019 8:09:28	fdoehring@utah.gov	Fred Doehring	TC 6A, All drawings and notes 2 and 3	When we were using color on the drawing it was clear where we wanted the contrasting color. Now that it is B&W the shades of grey are too similar. I think maybe note 2 needs to be revised to call out the contrasting color or note 3 could be added to the call out for note 2.	Contrast will be increased. Note 2 will be revised to "mark the detectable edge with a contrasting color." Use cross hatching if necessary.	Justin W
9/19/2019 8:14:48	fdoehring@utah.gov	Fred Doehring	TC 6A, Detail TC 6-1,2	The notes called out are not correct.	TC 6-1 has been corrected to reference note 6. TC 6-2 has remove reference to note 6.	Justin W
9/19/2019 8:17:11	fdoehring@utah.gov	Fred Doehring	TC 6A, Note 1	Suggest "Construct curb ramps and temporary walkways WITH a firm, stable, ..." You can't construct something of a surface.	Will add "material" after "surface".	Justin W
9/19/2019 8:21:15	fdoehring@utah.gov	Fred Doehring	TC 6A, Note 9	Do we need to refer them to the handrail detail on sheet TC 6B?	Will add "See Std Dwg TC 6B".	Justin W
9/19/2019 9:30:51	fdoehring@utah.gov	Fred Doehring	TC 6B, all	The vertical elements in Detail F are called out as "Pedestrian Channelizer" but reference Note 4 which talks about "Handrails". Are they supposed to be the channelizers in Detail C? If so, we ought to show the supports behind them and note 4 ought to be on Detail C as well. If Detail F is something other than Detail C, we probably need more detail for the handrails. Now that I've got to the next drawing, I'm wondering if it wouldn't be clearer to place Detail F on sheet TC 6C? It seems to be a cross section of these Sidewalk Diversions. Detail B and Detail C are not consistent with the word Channelizing vs. Channelizer. The legend on sheet TC 6C calls them Pedestrian Channelization Devices. Need to be consistent.	Will update "pedestrian channelizer" to "handrail" and will include dimensions for 34" min 38" max handrail height. Would prefer to keep detail on 6B since it is a device detail, whereas 6C is showing two different diversion methods. Walkway cross section is shown on TC 6C as entire detour path. Channelizing vs Channelizer. Talk with group about splitting the two in the legend. Use longitudinal in the road, other on sidewalk.	Justin W
9/19/2019 9:39:10	fdoehring@utah.gov	Fred Doehring	TC 6C	Signs W1-6 are Highway signs. Is it OK to use them for sidewalk traffic? Also, these seem much bigger than needed. Left detail, probably need to call out the shoulder stripe since you are dimensioning off of it. Note 5, what does "encroach into opposite direction of traffic" mean?	Will switch to M4-9 ped detour signs. This will help reduce confusion to the motorist if signs can be seen from the roadway. Will add dimension line stating "Edge of traveled way". Will remove "encroach into oposite direction of traffic".	Justin W
9/19/2019 9:42:29	fdoehring@utah.gov	Fred Doehring	TC 6B, Detail C	Do we need any kind of dimensions on this besides height. What is the maximum spacing of vertical elements?	Place vertical supports to ensure stability of channelization device. Show sand bag on support for ballast or create callout stating sandbags to be used as ballast.	Justin W
9/19/2019 9:50:14	fdoehring@utah.gov	Fred Doehring	TC 6D	Somewhere we need to define TPAR. Note 6: I don't understand the last sentence about omitting signs. Legend: Thick line for Pedestrian Channelization Device looks just like the crosswalk line. Don't want people thinking they should put Devices across the road! Perhaps call out crosswalk	Note 1 defines TPAR. Add (TPAR) to Std Dwg name. Updated sign number to "R9-8" Delete note from Omit... Removed pedestrian channelization device from legend.	Justin W
9/23/2019 9:08:24	kbarrett@utah.gov	Kelly Barrett	TC6	No Commnet		
9/23/2019 14:52:24	michaeladams@utah.g	Michael A. Adams	TC 6 Series	No Comment		
9/26/2019 12:36:39	jcorney@utah.gov	James Corney	TC6A	Dim. Ref. Table: Constrained/Unconstrained needs definition. The version to committee in Aug. had a statement regarding vertical edge greater than 3 inches. Is that what defines a constrained turning space?	Will add Note (III), Turning space is constrained when any surrounding vetical edge is greater than 3" . Will update table to reference Note (III)	Justin W
9/26/2019 12:36:54	jcorney@utah.gov		TC6A	Dim. Ref. Table, T2, Min. Dimensions: 5ft in the direction of travel does not make sense in a turning space. Please clarify.	Will update table to state 4' by 5 ft in the direction of travel. Add dimension to parallel to curb detail.	Justin W
9/26/2019 12:37:06	jcorney@utah.gov		TC6A	Dim. Ref. Table note (i): Note is awkward. What does steepen grade to match existing mean? Is this refering the existing street grade that is mentioned in note (ii)? Based on what we spoke about last time the ramp is allowed to exceed 8.3% to whatever slope is required if the ramp is 15 feet long, What about "Ramp length need not exceed 15 feet, disregard max. running slope requirements if ramp provided is 15 feet." Follow-up are you sure there is no maximum? The access board guidelines for outdoor developed ares 36 CFR Part 1191 - 1017.7 limits maximum running slopes from 8.33% to 10% to 30 feet, and 10% to 12% to 10 feet.	No, this is not referring to street grade. Will add "ramp" and "sidewalk" to the note to help clarify. According to PROWAG there is not a maximum stated for ramps.	Justin W

9/26/2019 12:37:18	jcorney@utah.gov		TC6A	Temporary Ramp Perpendicular to Curb: The walkway section is shown as a T1 "unconstrained turning space" This section has detectable edges, is it really unconstrained? This section is one directional, is it really a turning space? The Aug. version showed the turning space at the existing sidewalk.	T1 appropriately describes the width and slope requirements of this location. It is not constrained in the direction of travel. Note iii has been added to clarify what a constrained turning space is. Meets definition of turning space for PROWAG.	Justin W
9/26/2019 12:37:29	jcorney@utah.gov		TC6A	Surface Discontinuities Detail: Change reference for note 6 to note 5, there are no vertical discontinuities shown.	Will update to Note 5.	Justin W
9/26/2019 12:37:44	jcorney@utah.gov		TC6A	Edge Treatment Detail: Delete reference to note 7. Notes 6 and 7 apply to vertical discontinuities greater than 1/2 inch. The detail does not address that condition. The reference to note 7 from the temporary ramp details covers both options.	Reference to note 7 has been deleted. Detail names changed to Vertical discontinuities and Lateral discontinuities. Update note 6 to remove Detail TC 6-1. Remove callout under detail TC 6-1	Justin W
9/26/2019 12:37:55	jcorney@utah.gov		TC6A	General Note 6: Delete reference to Detail TC 6-1, the detail does not apply to vertical discontinuities greater than 1/2 inch.	Corrected to reference Note 5	Justin W
9/26/2019 12:38:04	jcorney@utah.gov		TC6A	General Note 6: Consider changing "temporary pedestrian surface" to "temporary walkways and ramps" to match the language used on the diversion and detour sheets.	Will remove pedestrian and update to temporary ramps and walkway surface. Changing on TC 6A and 6B.	Justin W
9/26/2019 12:38:15	jcorney@utah.gov		TC6A	General Note 7: The words "meeting the requirements of a ramp" were added to this version. Is that defined in the standards?	Yes, it is defined in the dimension reference table for a ramp. Will add as shown in the dimension reference table.	Justin W
9/26/2019 12:38:25	jcorney@utah.gov		TC6A	General Note 7: Consider changing "Temporary access route" to "temporary walkways and ramps" wasn't this one of the concerns raised in the last committee meeting?	The intent is to make the temporary route accesible to all using temporary measures. Would like to keep as temporary access route.	Justin W
9/26/2019 12:38:43	jcorney@utah.gov		TC6A	General Note 8: Change reference from PA 2 to PA 1 for the detectable warning surface detail.	Updated PA drawings has this detail on PA 2.	Justin W
9/26/2019 12:39:23	jcorney@utah.gov		TC6B	Delete Detail names (Detail A, Detail B, Detail C, Detail F). Detail naming of this type is not necessary and is not consistent on the sheet.	Detail names have been removed from details on TC 6B	Justin W
9/26/2019 12:39:38	jcorney@utah.gov		TC6B	Sidewalk Type 2 Barricade Detail: Delete reference to Note 8. Note 8 does not relate to the width of a Type 2 sidewalk Barricade	Will remove reference to Note 8	Justin W
9/26/2019 12:39:49	jcorney@utah.gov		TC6B	Sidewalk Type 2 Barricade Detail: Should the Contrasting Color note 10 callout be on this detail since it changes the direction of the detectable route?	No, MUTCD defines the colors/design of the type 2 barricade.	Justin W
9/26/2019 12:40:01	jcorney@utah.gov		TC6B	Pedestrian Longitudinal Channelizing Device Detail: Delete reference to notes 2 and 3, these are already referenced within the detail.	Will remove references to note 2 and 3	Justin W
9/26/2019 12:40:13	jcorney@utah.gov		TC6B	Continuous Pedestrian Channelizer Detail: Delete reference to Note 4, this channelizer does not satisfy the handrail requirements of note 4.	Note 4B is being removed since the detail shows the dimension. Note 4 then applies to the channlizer. Changing handaril surface to top surface.	Justin W
9/26/2019 12:40:24	jcorney@utah.gov		TC6B	Channelizer Details: Delete reference and note 6, it provides no additional information or clarity over the 32 inch dimension shown in the detail.	Will delete note 6 and reference. Update note numbers and callouts.	Justin W
9/26/2019 12:40:37	jcorney@utah.gov		TC6B	Temporary Walkway Section: Change callout from "Pedestrian Channelizer" to "Pedestrian Handrail" Note for refers to Handrails specifically, not channelizers, or else all channelizers would need to be at elast 34 inches high.	Updated to handrail.	Justin W
9/26/2019 12:40:47	jcorney@utah.gov		TC6B	Temporary Walkway Section: Move note 5 reference up to the "Temporary Walkway Surface" callout.	Will move Note 5.	Justin W
9/26/2019 12:40:58	jcorney@utah.gov		TC6B	Note 3: Delete "or width"	Will delete "or width".	Justin W
9/26/2019 12:41:07	jcorney@utah.gov		TC6B	Note 12: Consider changing "Temporary Pedestrian Surface" to "Temporary walkways and ramps."	Updated.	Justin W
9/26/2019 12:41:18	jcorney@utah.gov		TC6C	Move detail names below details	Will move detail names below.	Justin W
9/26/2019 12:41:29	jcorney@utah.gov		TC6C	Legend, ramp: Rename to "Temporary Ramp" to match TC 6D and delete reference back to TC 6A, that information is not just part of this drawing series but part of the same TC6 sub group.	Will update.	Justin W
9/26/2019 12:41:40	jcorney@utah.gov		TC6C	Note 4: Use plural "edges"	Will update.	Justin W
9/26/2019 12:41:54	jcorney@utah.gov		TC6C	Note 5: Delete "constructed of a firm, stable, and slip resistance surface" this is covered with better detail in TC 6B note 5	Will delete "construct...surface". Add see TC 6B, note 5.	Justin W
9/26/2019 12:42:05	jcorney@utah.gov		TC6C	Note 5: Delete "wide"	Will delete	Justin W
9/26/2019 12:42:16	jcorney@utah.gov		TC6C	Note 5: Starting form Shift Lanes… should at least be a new note if not deleted entirely. The need to shift lanes would be determined by the requirements shown in the Sidewalk Diversion Within Roadway detail, and shifting lanes in general requires the use of TC 8	Will create new note from Shift lanes.	Justin W

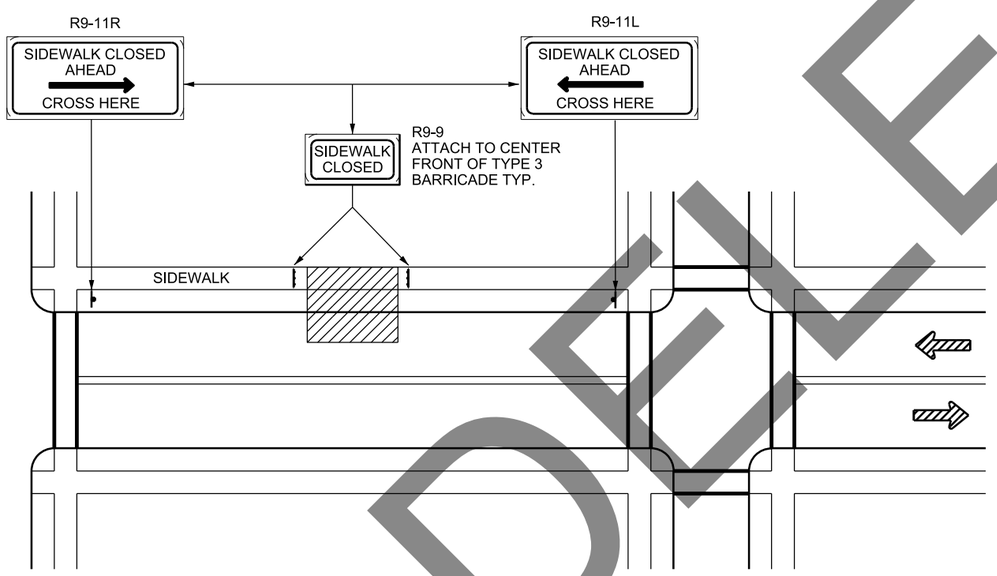
9/26/2019 12:42:26	jcorney@utah.gov		TC6C	Note 5: Starting from Reduce the travel lane… should at least be a new note if not deleted entirely. TC1 Note 10 is a general note applicable to all TC series drawings without needing to be referenced here.	This will be deleted.	Justin W
9/26/2019 12:42:36	jcorney@utah.gov		TC6C	Note 6: Add "or ramp" to "when temporary walkway [or ramp] is less than 5 ft wide."	Will change temporary walkway to TPAR.	Justin W
9/26/2019 12:42:45	jcorney@utah.gov		TC6C	Note 7: Add "and ramps" to "Cover the temporary walkway [and ramps] when the potential…"	Will change temporary walkway to TPAR.	Justin W
9/26/2019 12:42:55	jcorney@utah.gov		TC6C	Notes 10 and 11: Delete these notes. These details are not hidden or hard to find, they are part of this drawing series.	Notes 10 and 11 deleted	Justin W
9/26/2019 12:43:06	jcorney@utah.gov		TC6D	Sidewalk Detour - Crosswalk Closure detail: Verify that the Sidewalk Closed Use Other Side sign is in the right place. It is currently placed on the side of the detour route.	This is placed in the correct location to prevent pedestrians from crossing at this location.	Justin W
9/26/2019 12:43:17	jcorney@utah.gov		TC6D	Legend, pedestrian channelization device: Delete this item, there are many dark lines on these details, but it appears that only the lines in Detail A are intended to be pedestrian channelization devices. Add a callout to Detail A to identify the Pedestrian Channelization Devices.	Removed pedestrian channelization device from legend. Pedestrian Channelizing Devices will be removed from Detail A and other locations to be consistent with Roland's comment.	Justin W
9/26/2019 12:43:27	jcorney@utah.gov		TC6D	Legend, ramp: Delete reference back to TC 6A, that information is part of this drawing series.	reference has been deleted.	Justin W
9/26/2019 12:43:36	jcorney@utah.gov		TC6D	Legend, Channelizing Devices: Rename to Vehicular Channelizing Devices	Channelizing devices is standard language in the MUTCD. Section 6F.63	Justin W
9/26/2019 12:43:47	jcorney@utah.gov		TC6D	Legend, Type B Warning Light: Where is this defined? It is not in the drawings or the specifications.	MUTCD defines Type B warning lights	Justin W
9/26/2019 12:43:56	jcorney@utah.gov		TC6D	Note 5: Use plural "edges"	change made	Justin W
9/26/2019 12:44:08	jcorney@utah.gov		TC6D	Note 6: There are no requirements here, when would anyone choose to install a mid block crossing?	The amount of out of direction travel must be defined by UDOT on a project by project basis - probably as part of the limitation of operations or other project documents. The presence in the standards shows how to do it, the project decides when to require it	Justin W
9/26/2019 12:44:18	jcorney@utah.gov		TC6D	Note 6: Replace R9-9 sign assembly with R9-8	Sentence deleted. If mid block is not provided, sidewalk detour - mid block closure detail would be used.	Justin W
9/26/2019 12:44:29	jcorney@utah.gov		TC6D	Notes 12 and 13: Delete these notes. These details are part of this drawing series.	Notes 12 and 13 deleted.	Justin W
9/26/2019 12:44:41	jcorney@utah.gov		TC6D	Note 15: Add "vehicular" to "Place [vehicular] channelization devices…"	Channelizing devices is standard language in the MUTCD. Section 6F.63	Justin W
9/26/2019 13:39:40	jtremaine@utah.gov	Janice Tremaine	TC 6 Drawing	No comment		
9/27/2019 12:06:58	rarnell@utah.gov	Rhett Arnell	TC 6	No Comment		
9/30/2019 9:07:37	dpage@utah.gov	Danny Page	TC 6 Series Drawings	No Comments		
9/30/2019 10:31:27	brettslater@utah.gov	Brett Slater	TC 6 Series	No Comment		
9/30/2019 16:31:47	kentalbot@utah.gov	Ken Talbot	TC 6B	Will all these TPAR devices meet MASH 2019 or NCHRP 350?	The only device that has not been tested is the continuous pedestrian channelizer. Will show that pedestrian channelizer will be used on back of curb. Longitudinal channelizing device will be used in roadway. Add note stating MASH compliant devices only in roadway.	Justin W
9/30/2019 16:32:09	kentalbot@utah.gov	Ken Talbot	TC 6C	Sidewalk Diversion Within Roadway Detail - Doesn't seem very safe.	Longitudinal channelizer to be used in the roadway instead of pedestrian channelizer as shown in MUTCD Typcial Applicaiton 28.	Justin W
9/30/2019 16:33:06	kentalbot@utah.gov	Ken Talbot	TC 6C	Note 5 - Is closing lanes for these detours really the direction the Department wants to go? Seems like this should be a Region decision, from project to project, not just a blanket allowance to close. This will probably conflict with 0555 limitations.	This will remain a region decision in regards to implementation. This drawing is to provide guidance on how to implement. 0555 should include ped requirements and lane limitations should be considered when deciding on which detour is feasible. Reword note to state "See Std Dwg TC 8 for lane closure and lane shift details."	Justin W
9/30/2019 16:33:44	kentalbot@utah.gov	Ken Talbot	TC 6C	Note 5 - The shifting of lanes will cause scaring on pavements where permenant and temporary paint is removed and may cause premature failure of some types of pavements (OGSC & Micro)	We understand this possiblity, this should be determined on a project by project basis.	Justin W

9/30/2019 16:34:54	kentalbot@utah.gov	Ken Talbot	General	This allows the contractor to choose the type of diversion that best meets their construction phasing, which means there might be scenarios where we have a situation that is less than desirable had the Department called out the type of diversion to be used. It might make sense for the Department to decide the type to be used during design and specify it in the contract, or left up to the contractor but at least we had the chance to call it out.	Agreed, the Regions should consider what type of diversion is needed or if it can be decided by the contractor if no preference is stated. Will work with the regions to get this information out and understand what should be considered for a pedestrian TC plan.	Justin W
9/30/2019 16:35:14	kentalbot@utah.gov	Ken Talbot	TC 6C	Note 13 - why do trailing end blunt ends need to be protected? Seems like this should be a project specific decision.	Will reword to "Protect blunt ends within maximum clear zone. Consider all directions of travel."	Justin W
9/30/2019 16:35:39	kentalbot@utah.gov	Ken Talbot	TC 6D	Note 2 - Should this note be on sheet TC 6C also?	Will move Note 2 to sheet TC 1. Will reference TC 6D on notes B and C, and TC 6C on note A.	Justin W
9/30/2019 16:36:00	kentalbot@utah.gov	Ken Talbot	TC 6D	Note 2.B - Replace "Detour" with "TPAR" to be consistent with A & C.	Will change "Detour" to "TPAR"	Justin W
9/30/2019 16:36:29	kentalbot@utah.gov	Ken Talbot	TC 6D	Note 2 - recommend changing these order of preference: B becomes A, C becomes B, and A becomes C.	To minimize the disruption to pedestrians, would prefer to keep order as shown in drawing. Regions have the ability to choose which routing option works for the project. Preference is to keep disruption to a minimum to encourage pedestrians to use the temporary facility and not stray into the work zone.	Justin W
9/30/2019 16:36:51	kentalbot@utah.gov	Ken Talbot	TC 6D	Note 4 - What does "Detectable Pedestrian Facility" mean?	Detectable by a visually impaired pedestrian via feet and cane. DETECTABLE BY LONG CANE USER has been added to the note.	Justin W/Glenn B
9/30/2019 16:37:14	kentalbot@utah.gov	Ken Talbot	TC 6D	Note 6 - Consider adding restrictions based on the pavement type. Removal of permanent/temp paint may cause certain pavements to fail prematurely and will scar other pavements.	Region should specify what type of TPAR will work for the project and determined on a project by project basis.	Justin W
10/1/2019 7:24:49	GBLACKWELDER@ut	Glenn Blackwelder	TC 6 Series	No comments		
10/4/2019 13:06:43	dfriant@utah.gov	Daryl Friant	TC6	No Comments		
10/7/2019 16:32:42	dlahusen@avenuecons	ACEC	TC6	No Comment		
10/8/2019 17:43:25	Branden@utah.gov	Branden Anderson	TC-6 Series	No Comment		
10/9/2019 1:13:57	raycook@utah.gov	Ray Cook	TC 6A	Some of the circled text does not fit within the circles. Adjust to ensure readability.	Adjusted	Justin W
10/9/2019 1:15:04	raycook@utah.gov	Ray Cook	TC 6B	Note 3: Change "inches" to "inch."	Corrected	Justin W
10/9/2019 1:16:51	raycook@utah.gov	Ray Cook	TC 6C	Note 5: Delete "wide." (redundant)	Corrected	Justin W
10/10/2019 11:16:10	mcrasmussen@utah.g	Marjorie Rasmusser	TC 6	No Comments		
		FHWA	TC6C	Pedestrian Channelizing device parallel to sidewalk at start of diversion next to ROW - this will likely encroach into to private property and is not needed.	Removed	Glenn B
		FHWA	TC6	Use thicker line for Ped channelizing to represent the fact that these have width of up to 24 inches	Making Line thicker	Glenn B
		FHWA/ Glenn Blackwelder	TC6 B	Use MUTCD language - Longitudian channelizer should be Barrier, continuous ped channelizer should be longitudinal channelizer	Change PEDESTRIAN LONGITUDINAL CHANNELIZING DEVICE to TEMPORARY PORTABLE BARRIER CHANNELIZING DEVICE. CONTINUOUS PEDESTRIAN CHANNELIZER to be changed to LONGITUDINAL PEDESTRIAN CHANNELIZER	Glenn B



TEMPORARY WALKWAY

(DETAIL TC 6-1) SEE NOTE 1



ALTERNATE ROUTE

(DETAIL TC 6-2) SEE NOTES 1 & 12

NOTES:

1. ONLY THE TRAFFIC CONTROL DEVICES CONTROLLING PEDESTRIAN FLOWS ARE SHOWN. OTHER DEVICES ARE REQUIRED TO CONTROL TRAFFIC ON THE STREET. USE LANE CLOSURE SIGNING OR ROAD NARROWS SIGNS, AS NEEDED.
2. PROVIDE A TEMPORARY WALKWAY A MINIMUM OF 48 INCHES WIDE AROUND THE WORK SPACE IF WALKWAY IS CLOSED TO PEDESTRIANS. MAINTAIN A MINIMUM TRAVELED WAY WIDTH OF 10 FT. PROVIDE LANE SHIFTS, LANE CLOSURES, OR ENCROACH INTO OPPOSITE DIRECTION OF TRAFFIC ACCORDING TO STD DWG TC 8 IF THE MINIMUM CAN NOT BE ACHIEVED.
3. DIRECT PEDESTRIANS TO ALTERNATE ROUTES IF WALKWAY CANNOT BE PROVIDED. (SEE DETAIL TC 6-2)
4. COVER THE TEMPORARY WALKWAY WHEN POTENTIAL OF FALLING MATERIAL EXISTS.
5. CONSTRUCT TEMPORARY WALKWAY WITH A WOOD FLOOR OR PAVED SURFACE SO THAT IT IS TRAVERSABLE BY A WHEELCHAIR.
6. COMPLETE WORK ON ONE SIDE AND REOPEN PRIOR TO STARTING WORK ON THE OTHER SIDE WHEN SIDEWALKS EXIST ON BOTH SIDES OF STREET.
7. MOUNT SIGNS ON BARRICADE OR 7 FT MINIMUM HEIGHT ABOVE SIDEWALK.
8. MAINTAIN AN ACCESSIBLE AND DETECTABLE PEDESTRIAN FACILITY ALONG THE ALTERNATE PEDESTRIAN ROUTE WHEN THE TEMPORARY TRAFFIC CONTROL ZONE AFFECTS EXISTING ACCESSIBLE AND DETECTABLE PEDESTRIAN FACILITIES. USE A CONTINUOUS DETECTABLE BOTTOM AND TOP SURFACE DETECTABLE BY LONG CANE USERS WHEN CHANNELIZATION DEVICES ARE USED TO CHANNELIZE PEDESTRIANS. THE BOTTOM OF THE BOTTOM SURFACE WILL BE NO HIGHER THAN 2 INCHES ABOVE THE GROUND. THE TOP OF THE TOP SURFACE WILL BE NO LOWER THAN 32 INCHES ABOVE THE GROUND.
9. USE A MINIMUM 20 FT CORNER RADIUS TO DEVELOP A TEMPORARY WALKWAY AROUND A CORNER.
10. DIRECT PEDESTRIANS TO AN INTERSECTION OR MARKED CROSSWALK AS AN ALTERNATE ROUTE WHEN POSSIBLE.
11. CONSULT THE ENGINEER WHEN SCHOOL ROUTING PLANS ARE AFFECTED.
12. DO NOT DIRECT PEDESTRIANS TO OPPOSITE SIDE OF STREET IF THE SIDEWALK DOES NOT EXIST ON THE OPPOSITE SIDE OF THE STREET.
13. PROVIDE A 5 x 5 FT PASSING AREA EVERY 200 FT OF TEMPORARY SIDEWALK.
14. SEE GW 5 SERIES STD DWGS FOR PEDESTRIAN ACCESS REQUIREMENTS.
15. SEE STD DWG TC 4A FOR TRAFFIC CONTROL DEVICE LEGEND.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL	JAN. 01, 2017 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	JAN. 01, 2017 DATE
DEPUTY DIRECTOR	

TEMPORARY PEDESTRIAN ACCESS ROUTE

STANDARD DRAWING TITLE

STD. DWG. NO.

TC 6

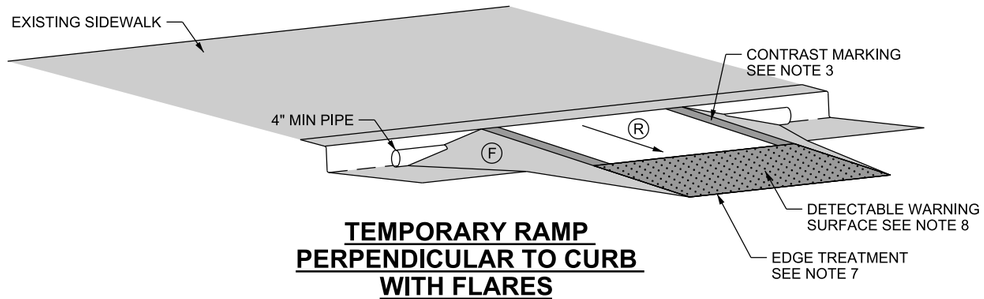
DGN File: D:\Standardsandspecs\Section\Standards Committee\MeetingFiles\2019\6-October 31, 2019\Incoming\SAF - Justin Wilstead - TC 6\All-Draft\TC 6_DELETION.dgn
18-SEP-2019

DIMENSION REFERENCE TABLE				
	ITEM	MAX. RUNNING SLOPE	MAX. CROSS SLOPE	MIN. DIMENSIONS
(T1)	UNCONSTRAINED TURNING SPACE (iii)	2.0%	2.0% (ii)	4 FT X 4 FT
(T2)	CONSTRAINED TURNING SPACE (iii)	2.0%	2.0% (ii)	4 FT X 5 FT IN DIRECTION OF TRAVEL
(R)	RAMP	8.3% (i)	2.0% (ii)	4 FT WIDE
(F)	FLARE	-	25.0%	-

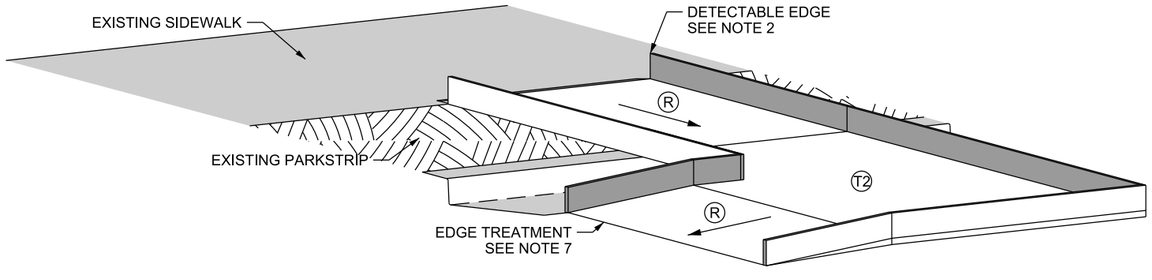
(i) STEEPEN RAMP GRADE TO MATCH EXISTING SIDEWALK WITHIN AT LEAST 15 FT OR THE NEXT NEAREST JOINT IF THE MAX RUNNING SLOPE CAN NOT BE MET IN 15 FT.

(ii) MID BLOCK CROSSINGS CAN MATCH THE STREET GRADE.

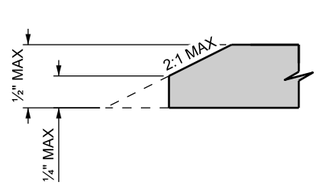
(iii) TURNING SPACE IS CONSTRAINED WHEN BACK OF WALKWAY HAS A VERTICAL EDGE GREATER THAN 3 INCH.



TEMPORARY RAMP PERPENDICULAR TO CURB WITH FLARES

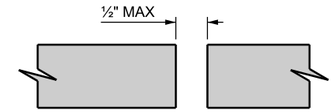


TEMPORARY RAMP PARALLEL TO CURB



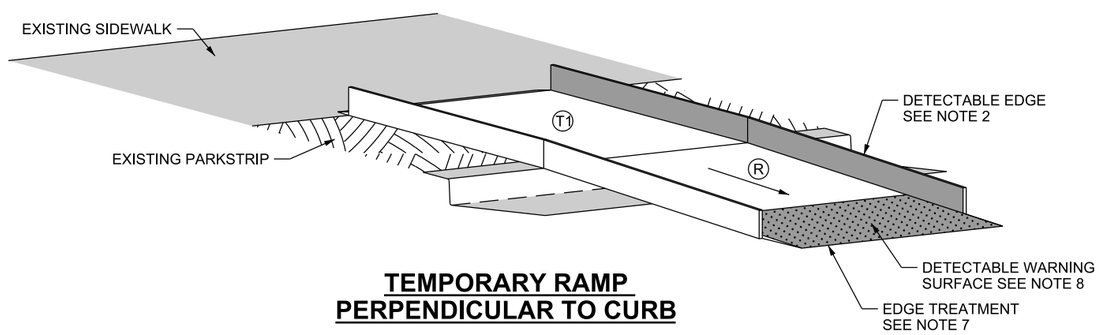
VERTICAL DISCONTINUITIES DETAIL TC 6-1

SEE NOTE 6



LATERAL DISCONTINUITIES DETAIL TC 6-2

SEE NOTE 5



TEMPORARY RAMP PERPENDICULAR TO CURB

GENERAL NOTES:

1. CONSTRUCT CURB RAMPS AND TEMPORARY WALKWAYS OF A FIRM, STABLE, AND SLIP RESISTANT SURFACE MATERIAL THAT IS CAPABLE OF SUPPORTING THE WEIGHT OF MOBILITY DEVICES AND PEDESTRIANS IN WHEELCHAIRS WITHOUT BUCKLING OR WARPING.
2. INSTALL DETECTABLE EDGE WITH 6 INCH MINIMUM HEIGHT ON TEMPORARY RAMPS AND TURNING SPACES THAT DO NOT HAVE FLARES. MARK THE DETECTABLE EDGE WITH A CONTRASTING COLOR.
3. MARK THE TEMPORARY RAMP WALKWAY EDGE WITH A CONTRASTING COLOR, 4 INCH WIDE MARKING TO BE INCLUDED IN THE WIDTH OF THE RAMP. THE MARKING IS OPTIONAL WHERE COLOR CONTRASTING DETECTABLE EDGE IS USED.
4. DO NOT BLOCK THE FLOW OF WATER IN THE GUTTER SYSTEM.
5. LIMIT WIDTH OF LATERAL JOINTS AND GAPS BETWEEN SURFACES TO ½ INCH. SEE DETAIL TC 6-2.
6. PREVENT OR CORRECT VERTICAL DISCONTINUITIES GREATER THAN ½ INCH ON TEMPORARY RAMP AND WALKWAY SURFACE. SEE DETAIL TC 6-1.
7. A THRESHOLD MEETING THE REQUIREMENTS OF A RAMP AS SHOWN IN THE DIMENSION REFERENCE TABLE CAN BE INSTALLED WHEN VERTICAL DISCONTINUITY IS GREATER THAN ½ INCH ANYWHERE IN TEMPORARY ACCESS ROUTE.
8. PROVIDE DETECTABLE WARNING SURFACE WHEN TEMPORARY RAMP CONNECTS TO A CROSSWALK. SEE STD DWG PA 2 FOR DETECTABLE WARNING SURFACE REQUIREMENTS.
9. INSTALL HANDRAILS ON BOTH SIDES OF THE TEMPORARY RAMP WHEN RAMP SURFACE IS GREATER THAN 12 INCH ABOVE SURROUNDING SURFACE. SEE STD DWG TC 6B.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

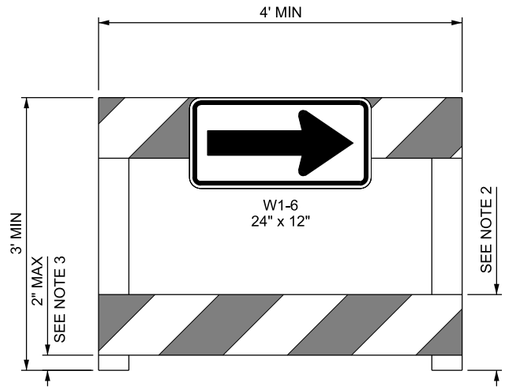
RECOMMENDED FOR APPROVAL	OCT. 31, 2019 DATE	
CHAIRMAN STANDARDS COMMITTEE APPROVED	OCT. 31, 2019 DATE	
DEPUTY DIRECTOR	DATE	

STANDARD DRAWING TITLE

TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) - RAMP DETAILS

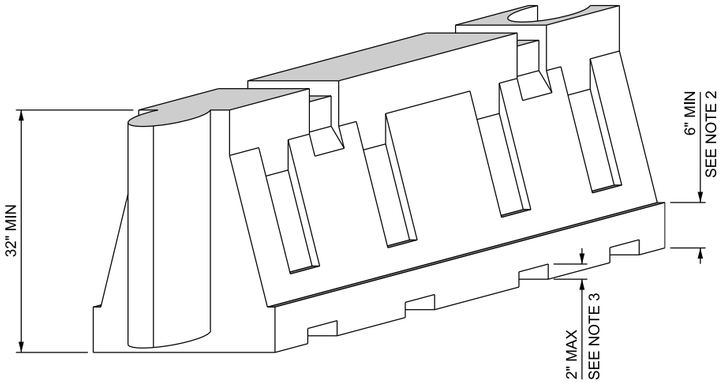
STD. DWG. NO.

TC 6A



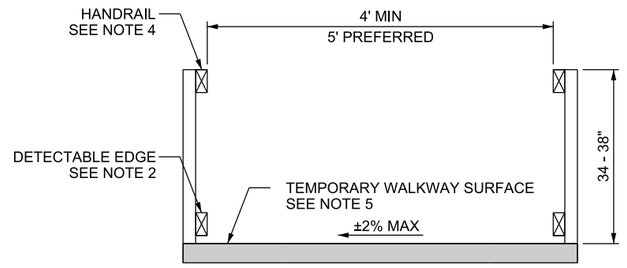
SIDEWALK TYPE 2 BARRICADE

SEE NOTE 13

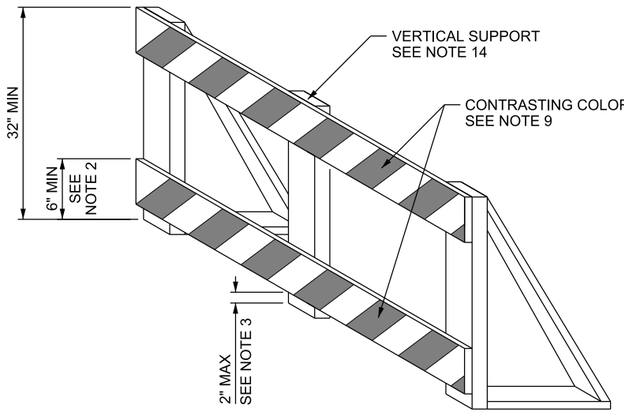


TEMPORARY PORTABLE BARRIER CHANNELIZING DEVICE

SEE NOTE 7



TEMPORARY WALKWAY SECTION



LONGITUDINAL PEDESTRIAN CHANNELIZER

SEE NOTES 4, 7, 12, 13

NOTES:

1. ALL TRIPPING HAZARDS IN THE WALKWAY NEED A DETECTABLE EDGE. LOCATE BALLAST BEHIND OR INTERNAL TO THE DEVICE. LOCATE DEVICE SUPPORT LEGS BEHIND THE DETECTABLE EDGE.
2. DETECTABLE EDGES USED AROUND BARRICADES, AND PEDESTRIAN CHANNELIZERS AND PORTABLE SIGNS, MUST BE CONTINUOUS, HAVE A HEIGHT ABOVE WALKWAY SURFACE OF AT LEAST 6 INCH, AND HAVE COLOR MARKINGS CONTRASTING WITH THE WALKWAY SURFACE.
3. MAINTAIN DRAINAGE OFF THE WALKWAY. A MAXIMUM GAP HEIGHT FROM THE WALKWAY SURFACE OF 2 INCH IS ALLOWED FOR DRAINAGE PURPOSES.
4. THE TOP SURFACE MUST MEET THE FOLLOWING WHEN HAND GUIDANCE IS REQUIRED:
   A. BE IN A VERTICAL PLANE PERPENDICULAR TO THE WALKWAY ABOVE THE DETECTABLE EDGE,
   B. BE SUPPORTED WITH MINIMAL INTERFERENCE TO THE PEDESTRIAN'S HANDS, AND
   C. BE SMOOTH AND FREE OF SHARP AND ROUGH EDGES TO PREVENT HARM TO HANDS, ARMS OR CLOTHING OF PEDESTRIANS.
5. PROVIDE A FIRM, STABLE, FREE-DRAINING AND NON-SLIP TEMPORARY WALKWAY SURFACE THAT ALLOWS NORMAL USAGE OF WHEELCHAIRS, WALKERS, STROLLERS, AND OTHER MOBILITY DEVICES.
   A. CONCRETE, HMA, STEEL, RUBBER, WOOD (¾ INCH OR THICKER), AND PLASTIC ARE ACCEPTABLE SURFACE MATERIALS.
   B. GRAVEL, UNTREATED BASE COURSE, AND OTHER UNEVEN SURFACES ARE NOT ACCEPTABLE SURFACE MATERIALS.
6. KEEP PORTABLE SIGNS AND BASES OUT OF THE PEDESTRIAN WALKWAY SURFACE. SIGNS PLACED ON WIDE SIDEWALKS MUST NOT REDUCE SIDEWALK WIDTH TO LESS THAN 4 FT.
7. CONNECT DEVICES USED TO CHANNELIZE PEDESTRIANS SUCH THAT GAPS DO NOT ALLOW PEDESTRIANS TO STRAY FROM THE CHANNELIZED PATH.
8. PLACE SIDEWALK TYPE 2 BARRICADE ACROSS AT LEAST TWO-THIRDS OF THE WIDTH OF THE CLOSED WALKWAY SURFACE.
9. APPLY CONTRASTING COLOR TO PEDESTRIAN CHANNELIZING DEVICES WHEN USED TO CHANGE DIRECTION OF DETECTABLE ROUTE. CONTRASTING COLOR IS OPTIONAL WHEN USED PARALLEL TO DETECTABLE ROUTE.
10. CONTRASTING COLORS INCLUDE YELLOW, ORANGE, AND ORANGE/WHITE RETROREFLECTIVE STRIPES.
11. PREVENT OR CORRECT VERTICAL DISCONTINUITIES GREATER THAN ½ INCH ON TEMPORARY RAMP AND WALKWAY SURFACE.
12. DEVICES USED IN ROADWAY MUST BE MASH COMPLIANT.
13. SEE STD DWG TC 2B NOTE 6 FOR BALLAST PLACEMENT.
14. PLACE VERTICAL SUPPORTS TO ENSURE STABILITY OF CHANNELIZATION DEVICE.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

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SALT LAKE CITY, UTAH

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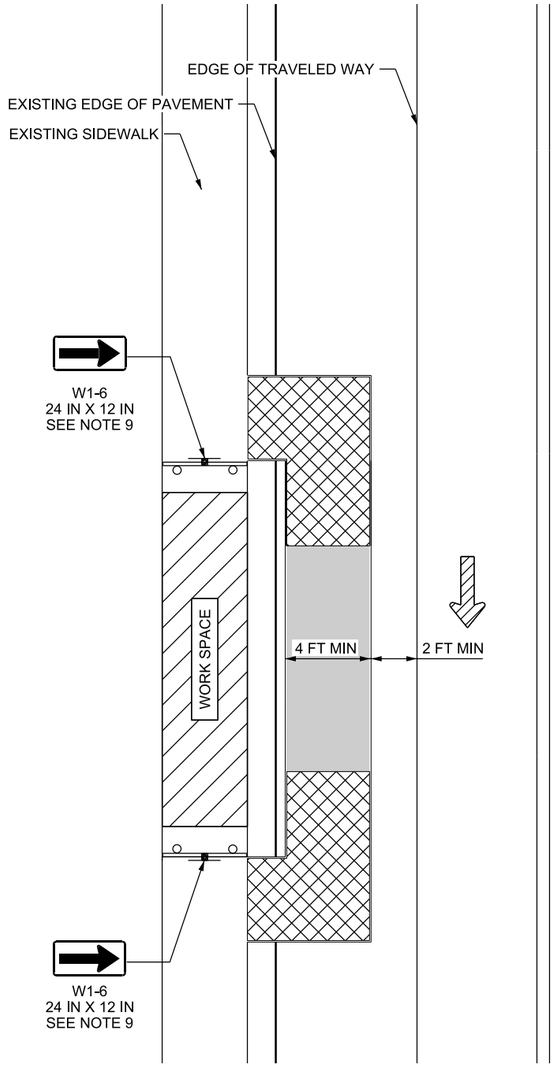
TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) - WALKWAY AND DEVICE DETAILS

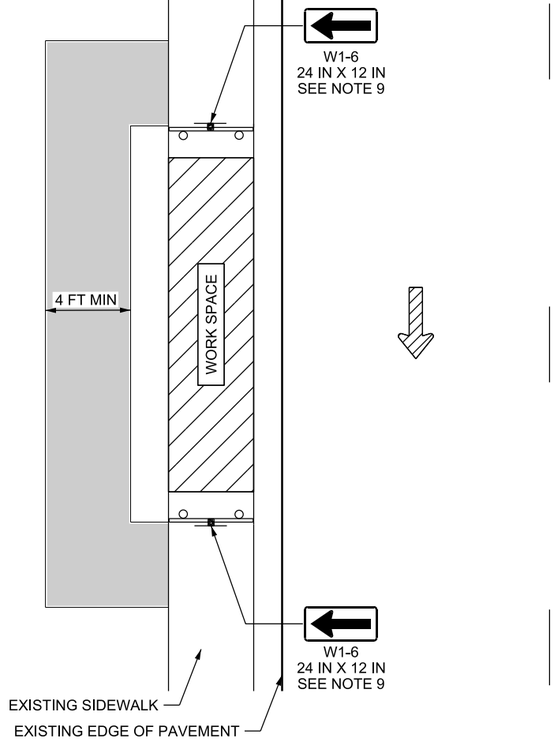
STANDARD DRAWING TITLE

STD. DWG. NO.

TC 6B



SIDEWALK DIVERSION WITHIN ROADWAY



SIDEWALK DIVERSION OUT OF ROADWAY

TEMPORARY PEDESTRIAN ACCESS ROUTE DEVICE LEGEND

- SIGN (FIXED OR PORTABLE)
- PEDESTRIAN CHANNELIZATION DEVICE
- DIRECTION OF TRAFFIC
- SIDEWALK TYPE 2 BARRICADE
- TEMPORARY RAMP
- TEMPORARY WALKWAY

NOTES:

1. PHASE WORK AS NECESSARY TO PROVIDE A TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) AT ALL TIMES.
2. ONLY THE TPAR DEVICES ARE SHOWN. USE WORK SPACE SIGNING OR SHOULDER WORK SPACE SIGNING AS NEEDED.
3. MAINTAIN A TPAR THAT IS CONSISTENT WITH THE LEVEL OF ACCESSIBILITY PRESENT BEFORE CONSTRUCTION.
4. USE CONTINUOUS DETECTABLE EDGES ON ALL PEDESTRIAN CHANNELIZATION DEVICES.
5. PROVIDE A TEMPORARY WALKWAY, SEE STD DWG TC 6B NOTE 5, WITH A MINIMUM WIDTH OF 4 FT AROUND THE WORK SPACE IF SIDEWALK IS CLOSED TO PEDESTRIANS.
6. SEE STD DWG TC 8 FOR LANE CLOSURE AND LANE SHIFT DETAILS.
7. PROVIDE A 5 FT X 5 FT PASSING SPACE EVERY 200 FT WHEN TPAR IS LESS THAN 5 FT WIDE.
8. COVER TPAR WHEN THE POTENTIAL FOR FALLING MATERIAL EXISTS.
9. MOUNT SIGNS ON FRONT OF SIDEWALK TYPE 2 BARRICADE, PEDESTRIAN CHANNELIZER, OR ACCORDING TO STD DWG SN 2A.
10. PLACE TEMPORARY TRAFFIC CONTROL DEVICES SUCH THAT LINE OF SIGHT BETWEEN VEHICLE TRAFFIC AND PEDESTRIAN TRAFFIC IS NOT HINDERED.
11. USE AN OUTSIDE CORNER RADIUS OF AT LEAST 20 FT TO DEVELOP A TEMPORARY WALKWAY AROUND A CORNER ON THE ROADWAY.
12. PROTECT BLUNT ENDS WITHIN THE MAXIMUM CLEAR ZONE. CONSIDER ALL DIRECTIONS OF TRAVEL.
13. USE A SIDEWALK DIVERSION OUT OF ROADWAY WHEN RIGHT-OF-WAY IS AVAILABLE BEHIND THE BACK OF SIDEWALK. A SIDEWALK DIVERSION MAY ALSO BE PLACED IN THE PARK STRIP WHEN IT IS WIDE ENOUGH TO ACCOMMODATE THE TEMPORARY WALKWAY.

SUPPLEMENTAL DRAWING

REVISIONS

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UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

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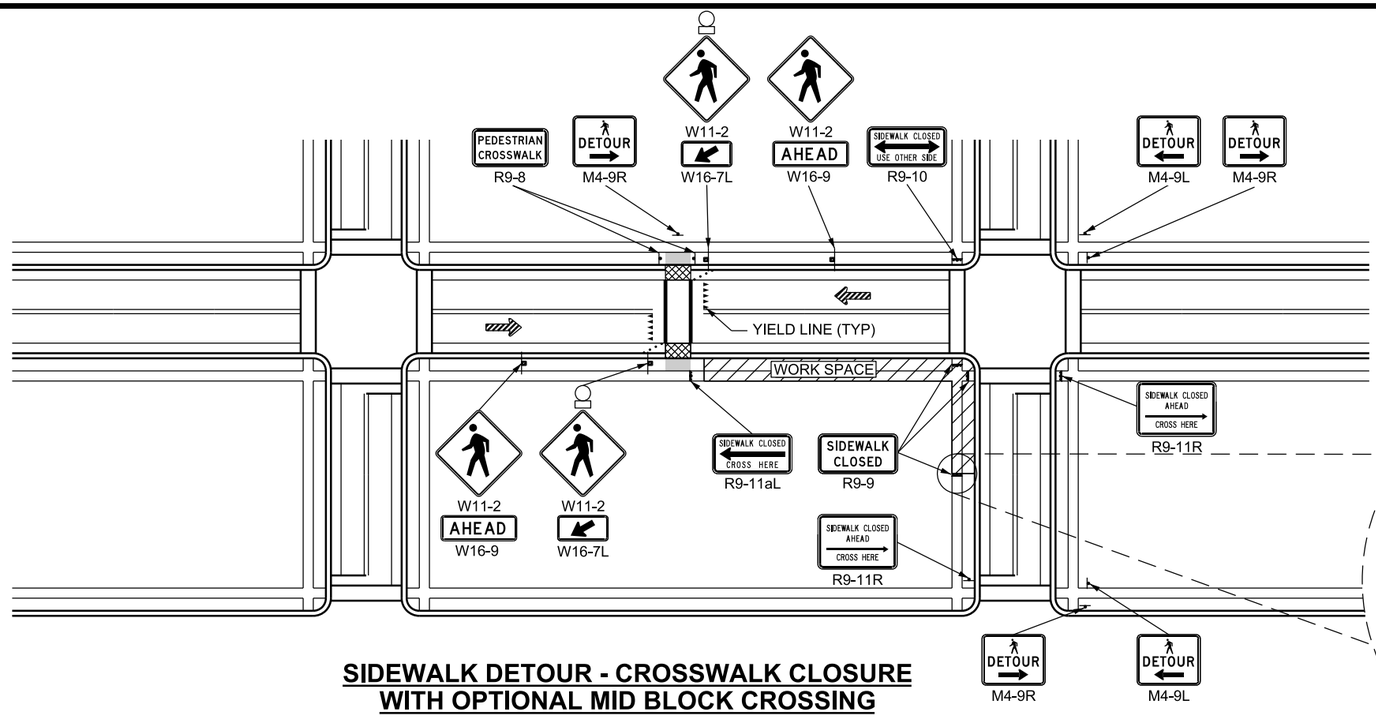
DEPUTY DIRECTOR		

TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) - DIVERSION

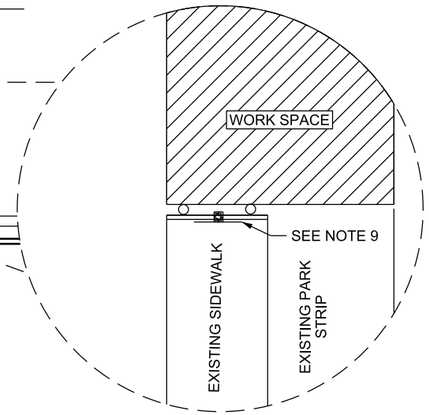
STANDARD DRAWING TITLE

STD. DWG. NO.
TC 6C



SIDEWALK DETOUR - CROSSWALK CLOSURE WITH OPTIONAL MID BLOCK CROSSING

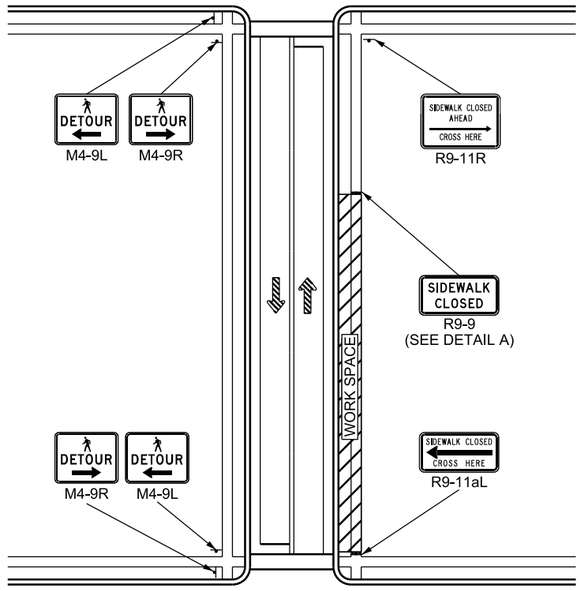
SEE NOTE 5



DETAIL A

TEMPORARY PEDESTRIAN ACCESS ROUTE DEVICE LEGEND

- SIGN (FIXED OR PORTABLE)
- DIRECTION OF TRAFFIC
- SIDEWALK TYPE 2 BARRICADE
- TEMPORARY RAMP
- TEMPORARY WALKWAY
- CHANNELIZING DEVICES
- TYPE B WARNING LIGHT



SIDEWALK DETOUR - MID BLOCK CLOSURE

NOTES:

1. PHASE WORK AS NECESSARY TO PROVIDE A TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) AT ALL TIMES.
2. ONLY THE TPAR DEVICES ARE SHOWN. USE WORK SPACE SIGNING OR SHOULDER WORK SPACE SIGNING AS NEEDED.
3. MAINTAIN A PEDESTRIAN FACILITY DETECTABLE BY LONG CANE USER ALONG THE TPAR WHEN THE WORK SPACE AFFECTS EXISTING PEDESTRIAN FACILITIES. TPAR MUST PROVIDE THE LEVEL OF ACCESSIBILITY PRESENT BEFORE CONSTRUCTION.
4. USE CONTINUOUS DETECTABLE EDGES ON ALL PEDESTRIAN CHANNELIZATION DEVICES.
5. TEMPORARY MID BLOCK CROSSING MAY BE USED IF IT IS MORE THAN 600 FEET FROM SIGNALIZED CROSSING, WILL BE IN PLACE FOR LONGER THAN 14 DAYS, AND THE ROADWAY SPEED LIMIT DOES NOT EXCEED 40 MPH.
6. LOCATE TEMPORARY YIELD LINES 20 TO 50 FT IN ADVANCE OF THE TEMPORARY CROSSWALK ON UNCONTROLLED MULTI-LANE APPROACHES AND AT 5 FT FOR SINGLE LANE APPROACH. PROHIBIT STREET PARKING FOR AT LEAST 50 FT IN ADVANCE OF THE TEMPORARY CROSSWALK. USE R1-5 SERIES SIGNS ON UNCONTROLLED MULTI-LANE APPROACH. USE 10 FT MOUNTING HEIGHT OF CROSSWALK ASSEMBLY TO BOTTOM OF W16-7P TO PREVENT VISUAL BLOCKING FROM R1-5 SIGN.
7. USE TEMPORARY PAVEMENT MARKING FOR TEMPORARY CROSSWALK LINES AND YIELD LINES.
8. COVER OR DEACTIVATE PEDESTRIAN TRAFFIC SIGNAL DISPLAY CONTROLLING CLOSED CROSSWALK.
9. MOUNT SIGNS ON FRONT OF SIDEWALK TYPE 2 BARRICADE, PEDESTRIAN CHANNELIZER, OR ACCORDING TO STD DWG SN 2A.
10. PLACE TEMPORARY TRAFFIC CONTROL DEVICES SUCH THAT LINE OF SIGHT BETWEEN VEHICLE TRAFFIC AND PEDESTRIAN TRAFFIC IS NOT OBSTRUCTED.
11. CONSULT THE ENGINEER WHEN SCHOOL ROUTING PLANS ARE AFFECTED.
12. PLACE CHANNELIZATION DEVICES ON A TAPER UPSTREAM OF TEMPORARY RAMPS THAT EXTEND INTO THE SHOULDER TO DIRECT VEHICLES AND BICYCLISTS AWAY FROM THE TEMPORARY RAMP.

SUPPLEMENTAL DRAWING

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TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) - DETOUR

STANDARD DRAWING TITLE

STD. DWG. NO.
TC 6D

GENERAL NOTES (APPLIES TO ALL TC SERIES STANDARD DRAWINGS):

1. USE UDOT STANDARDS FOR TRAFFIC CONTROL. USE THE UTAH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR TRAFFIC CONTROL ELEMENTS NOT SHOWN IN THE TC SERIES STD DWGS.
2. USE STANDARD HIGHWAY SIGNS & MARKING BOOK FOR SIZE AND DESIGN OF STANDARD SIGNS.
3. SEE STD DWG TC 2A AND TC 2B FOR WORK ZONE SIGNING AND DEVICE REQUIREMENTS.
4. USE MINIMUM SIGN SIZE OF 48 x 48 INCHES FOR DIAMOND WORK ZONE WARNING SIGNS.
5. COVER OR REMOVE NON-APPLICABLE SIGNING, BOTH EXISTING AND WORK ZONE SIGNS.
6. REMOVE NON-APPLICABLE PAVEMENT MARKINGS FOR OPERATIONS LONGER THAN 3 DAYS.
7. REMOVE OR RELOCATE NON-APPLICABLE PORTABLE SIGN SUPPORTS AND SIGNS BEYOND TWICE THE WORK CLEAR ZONE (WCZ) DISTANCE, SEE STD DWG TC 3A, TABLE 1.
8. REFER TO STANDARD SPECIFICATION 01554 FOR FLAGGING REQUIREMENTS AT OPERATING TRAFFIC SIGNALS.
9. PRE-CONSTRUCTION POSTED SPEED LIMIT: THE PERMANENT POSTED SPEED LIMIT PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
10. USE LANE WIDTH RESTRICTIONS OF LESS THAN 12 FT ONLY WHEN APPROVED BY THE ENGINEER WITH THE FOLLOWING MINIMUMS:
    A. PRE-CONSTRUCTION POSTED SPEED LIMIT LESS THAN 55 MPH, MINIMUM LANE WIDTH 10 FT.
    B. PRE-CONSTRUCTION POSTED SPEED LIMIT OF 55 MPH OR GREATER, MINIMUM LANE WIDTH 11 FT.
11. CLEAN AND RESTORE PAVEMENT MARKINGS, BOTH ON AND OFF THE PROJECT, THAT ARE OBSCURED BY WORK OPERATIONS AT THE END OF EACH DAY'S OPERATION.
12. OBTAIN APPROVAL FOR REGULATORY AND ADVISORY SPEED REDUCTIONS THROUGH THE ENGINEER. USE SPEED REDUCTIONS ONLY DURING IMPACTED TIMES AND AREAS.
13. RESTORE PRE-CONSTRUCTION POSTED SPEED LIMITS DURING TIMES AND IN LOCATIONS WHERE TRAFFIC IS NOT BEING IMPACTED BY WORK ACTIVITIES. SEE POLICY 06C-61.
14. USE AN ADDITIONAL W3-5 SETUP TO STEP DOWN THE SPEED IF MORE THAN A 20 MPH DROP IS REQUIRED.
15. USE THE PRE-CONSTRUCTION POSTED SPEED LIMIT PRIOR TO WORK ZONE TO COMPUTE THE SIGN SPACING, TAPER LENGTH, BUFFER ZONE, AND WORK CLEAR ZONE DISTANCES. USE THE WORK ZONE POSTED SPEED LIMIT TO DETERMINE THE TANGENT SPACING FOR CHANNELIZING DEVICES.
16. DO NOT USE TUBULAR MARKERS AS LANE CLOSURE TAPER DEVICES. USE DRUMS OR DIRECTION INDICATOR BARRICADES AS LANE CLOSURE TAPER DEVICES FOR SPEEDS 50 MPH AND GREATER.
17. USE A DOWNSTREAM TAPER FOR OPERATIONS LONGER THAN 3 DAYS.
18. ARROW BOARD PLACEMENT:
    A. PLACE ARROW BOARD ON THE SHOULDER OF THE ROADWAY OR, IF PRACTICAL, FURTHER FROM THE TRAVELED LANE. PLACE ARROW BOARD IN FIRST 1/3 OF TAPER IN THE CLOSED LANE WHEN NO ADEQUATE SHOULDER IS AVAILABLE. DELINEATE WITH RETROREFLECTIVE DEVICES.
    B. REMOVE ARROW BOARD WHEN NOT BEING USED OR SHIELDED BEHIND A TRAFFIC BARRIER AND TURNED AWAY FROM TRAFFIC. DELINEATE WITH RETRORELECTIVE DEVICES IF THE PREVIOUS TWO OPTIONS ARE NOT FEASIBLE.
    C. VERIFY THAT SIGN FACE IS ORIENTED TO FACE ONCOMING TRAFFIC.
19. USE AN APPROVED WORK ZONE CRASH CUSHION OR END TREATMENT SYSTEM WITH TEMPORARY PRECAST CONCRETE BARRIER WHEN APPROACH ENDS ARE WITHIN THE AASHTO CLEAR ZONE. USE APPROVED TRUCK MOUNTED ATTENUATOR SYSTEM FOR ONLY 72 HOURS OR LESS.
20. USE PROPER LENGTH OF NEED FOR TEMPORARY BARRIER AS PER THE REQUIREMENTS OF THE ROADSIDE DESIGN GUIDE. USE PRE-CONSTRUCTION POSTED SPEED LIMIT PRIOR TO THE WORK ZONE FOR THE DESIGN OF THE REQUIRED LENGTH OF NEED. SEE STD DWG TC 3A FOR THE WORK ZONE FLARE RATE REQUIREMENT FOR TEMPORARY BARRIER. APPROVAL FROM THE ENGINEER IS REQUIRED FOR MODIFICATION TO THE REQUIRED FLARE RATE.
21. USE STEEL PLATE AHEAD SIGN (W8-24) IN ADVANCE OF PLATE WHEN STEEL PLATES ARE PLACED ON THE ROADWAY. PLACE BUMP SIGN (W8-1) WITH A DIAGONAL DOWNWARD POINTING ARROW (W16-7P) PLAQUE ADJACENT TO THE STEEL PLATE.
22. USE IDENTICAL LEGEND SUPPLEMENTAL LEFT SIDE SIGNING FOR HIGH-SPEED DIVIDED HIGHWAYS.
23. MINIMIZE DISRUPTION TO PEDESTRIANS TO THE MAXIMUM EXTENT FEASIBLE BY PROVIDING A TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) IN THE FOLLOWING ORDER OF PREFERENCE:
    A. PROVIDE THE TPAR ON THE SAME SIDE OF THE ROADWAY AS THE DISRUPTED ROUTE UTILIZING SIDEWALK DIVERSION. SEE STD DWG TC 6C.
    B. PROVIDE THE TPAR ON THE OTHER SIDE OF THE ROADWAY WHERE IT IS NOT FEASIBLE TO PROVIDE A SAME SIDE TPAR. SEE STD DWG TC 6D.
    C. PROVIDE A TPAR DETOUR WITH TRAILBLAZING SIGNS WHERE IT IS NOT FEASIBLE TO PROVIDE A TPAR ON THE OTHER SIDE OF THE ROADWAY. SEE STD DWG TC 6D.
24. DO NOT USE AUTOMATED FLAGGER ASSISTANCE DEVICES (AFADs).
25. DO NOT USE PROMOTIONAL OR OTHER INFORMATIONAL IDENTIFICATIONS OF PUBLIC OFFICIALS, CONTRACTORS, ORGANIZATIONAL AFFILIATIONS, RELATED LOGOS AND SYMBOLS ON TRAFFIC CONTROL DEVICES. MARKINGS TO SHOW OWNERSHIP ON NON-REFLECTIVE SURFACES ARE ACCEPTABLE.
26. MEET STANDARD SPECIFICATION 01554 FOR CRASH WORTHINESS OF DEVICES.
27. REMOVE OR COVER ALL WORK ZONE REDUCED SPEED LIMIT ASSEMBLIES (RS2-1a) AND THE WORK ZONE REDUCED SPEED LIMIT AHEAD (W3-5 SERIES) SIGNS WHEN NO ONE IS WORKING, EXCEPT AS APPROVED BY THE ENGINEER.
    DO NOT COVER THE SPEED LIMIT ASSEMBLIES (RS2-1a) IF THE ASSEMBLIES ARE THE PRE-CONSTRUCTION POSTED SPEED LIMIT.
28. PROVIDE THE DISTANCE 2L BETWEEN EACH MANEUVER FOR MULTIPLE LANE DROPS, SHIFTS OR BOTH.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL	OCT. 31, 2019 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	OCT. 31, 2019 DATE
DEPUTY DIRECTOR	DATE

TRAFFIC CONTROL
DRAWING SERIES
GENERAL NOTES
STANDARD DRAWING TITLE

STD. DWG. NO.
TC 1

Standards Committee Submittal Sheet

Name of Preparer: Shawn Debenham

Title/Position of Preparer: Roadside Safety Manager

Specification/Drawing/Item Title:

Specification/Drawing Number: 02844M Concrete Barrier

Priority Level (see last page for explanation) 3

Completion of paragraphs A, F, and G are mandatory. Lack of information or insufficient information will result in rejection of agenda item.

NOTES:

1. All Submittal Sheets must be completed and sent to the Standards Section by meeting the applicable Coordination due date. (See https://www.udot.utah.gov/StandardsCommitteeScheduleDates)
2. The Preparer of the Submittal Sheet or the Standards Committee member (or authorized substitute) responsible for the submittal must be present at the Standards Committee or Modified Process meeting and capable of discussing and answering all questions related to the submittal. The item will be postponed to a later meeting if one of these people is not present.
3. Notify the Standards Section immediately of any changes that impact the presentation to include absence of sponsor or delay in presentation.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard or what has caused a new or changed item of interest. **(MANDATORY)**

The precast concrete barrier design has been changed from the Jersey shape to F-shape. The specification has been modified accordingly.

B. Measurement, Payment, Acceptance, and Documentation:

1. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.
No Change: Construction requirements have not changed due to note changes.

2. How is Acceptance and Documentation handled? Existing (from the acceptance and documentation document), modified, or new acceptance and documentation to be included with all Standard Specifications or Supplemental Specifications. Include Contractor Submittals, Inspection Elements, and Documentation.
No Change: Construction requirements have not changed due to note changes.

C. Stakeholder Notification for AGC and ACEC:

Provide by e-mail, the AGC and ACEC Standards Committee member a copy of all pertinent information relating to the specification or drawing. Detail all responses on the Standards Committee Review Comments Form.

Note: There is a two-week response time set for this item.

Refer to the Standards Committee Web site, http://www.udot.utah.gov/go/standardscommittee to "Standards Committee Members" for the respective e-mail addresses.

AGC: (Document comments on the Comment Form)

ACEC: (Document comments on the Comment Form)

D. Stakeholders:
Document the stakeholders contacted on the Standards Committee Review Comments Form, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change.
Stakeholders:

Note: There is a two-week response time set for this item to allow Stakeholders time to process and respond to coordination requests. All areas should try to complete review and comment as soon as possible but within two weeks. Advise Stakeholder if less time is given the Stakeholder to complete this requirement.

Contact all applicable UDOT personnel, FHWA representative for the type item being reviewed, contractors and consultants contacted in addition to those contacted in paragraph "C" above, suppliers, manufacturers and any others as deemed appropriate. Include all those contacted on the Standards Committee Review Comments Form.

FHWA (Accomplished as part of the two-week process before submitting to the Standards section for inclusion on the Standards Committee agenda.) This is in addition to the requirements of UDOT Policy 08A5-01, procedure 08A5-01.3.

E. Other impacted areas, systems, or personnel. Consider all impacts and possible changes to these areas during the preparation process. Coordinate with all appropriate areas for the respective item. List all impacts and action taken.

1. Minimum Sampling and Testing Requirements

   No Change

2. Business Systems (Electronic Bid System, Project Development Business System, Electronic Program Management, Computer-Aided Drafting and Design, etc.)

   No Change

3. Implementation Plan (Provide detailed instructions on how the subject item will be implemented to include notification of all interested parties and training requirements.) **E-mail notice will be sent as part of the Standards Section's publishing process.**

4. What additional systems and documents need modification to reflect this change?

   Specification 02844M will be modified from Jersey design to F-shape design information and the M&P items will be updated.

F. Costs? (Estimates are acceptable.)

1. Cost Impact to the Department (For example, unit bid price, change in quantity, total scope impacts in year, increase in contractor's overhead or mobilization).
   It is estimated that the costs of 32" precast barrier will increase 15 percent. The new design requires 20 percent more concrete per lineal foot than the Jersey design. The fabricators will pass on retooling expenses to the Department through increased barrier costs.

2. Operational (For example, maintenance, materials, equipment, labor, administrative, programming).

No Change: F-Shape design will be handled in the same manner as the Jersey design. The F-Shape 15 feet barrier length design weighs 3.4 tons which can be transported and installed with existing equipment. The barrier is placed in the same manner as the Jersey design.

3. Life cycle cost.

No Change: F-Shape design will perform in the same manner in regards to life cycle costs as the Jersey design.

G. Benefits? Provide details that can be used to complete a Cost – Benefit Analysis. Estimates are acceptable. What is the benefit of making this change if no cost is involved? **(MANDATORY)**

The F-Shape improves safety of the traveling public by reducing vehicle climb in sever impacts and improves post-crash trajectories, reduces the roll angle of impacting trucks and other vehicles with high centers-of-gravity.

H. Safety Impacts?

The F-shape provides improved impact performance over the New Jersey shape. Full- scale crash testing indicates that vehicles experience less climb and remain more stable during impacts with barriers having an F-shape profile compared to those with a New Jersey profile.

I. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

See Part A

Timestamp	Email Address	REVIEWER	DRAWING #, SECTION #, ARTICLE #, ETC.	COMMENT	RESPONSE	RESPONSE BY
9/23/2019 9:09:33	kbarrett@utah.gov	Kelly Barrett	02844M	No Comment		
9/23/2019 10:46:27	kthornock@utah.gov	Kirk Thornock	02844M	No Comments		
9/26/2019 8:46:04	nschellenberg@genevarock.com	Nathan Schellenberg	2844M	A number of contractors have significant inventories of the New Jersey barrier that is worth millions of dollars. This change in specification makes the value of that inventory effectively zero, causing significant financial losses for the contractors that currenly own barrier. If the existing barrier could be used through the rest of it's life (could be 10 years in some cases) as long as it was manufacured before the specification change, those losses could be avoided.	This change is required by FHWA and AASHTO and as such 01554 Specification was changed during the August Standards Meeting. The change provides a 3 year period for the New Jersey barrier to be used within workzones.	Shawn D
9/26/2019 13:41:06	jtremaine@utah.gov	Janice Tremaine	02844M Concrete Barrier	No comment		
9/26/2019 18:19:07	branden@utah.gov	Branden Anderson	02844M	No Comment		
9/27/2019 12:09:25	rarnell@utah.gov	Rhett Arnell	02844M	No Comment		
9/30/2019 9:08:34	dpage@utah.gov	Danny Page	2844M Spec	No Comments		
9/30/2019 10:36:36	brettslater@utah.gov	Brett Slater	02844M	No Comment		
10/1/2019 7:27:18	GBLACKWELDER@utah.gov	Glenn Blackwelder	All	No Comments		
10/7/2019 9:03:47	mcrasmussen@utah.gov	Marjorie Rasmussen	02844M	No Comment		
10/9/2019 0:07:47	raycook@utah.gov	Ray Cook	02844M	There are inconsistencies between BA series standard drawings and 02844. These are noted in the BA series comments. As part of the BA series review, the following was noticed: 3.1 should be revised: 3.1 A muddies the division of work between pay items suggesting that site work and crash cushions are part of barrier installation. Reword 3.1 A so it does not infer that grading work is part of barrier installation work. Delete reference to 01554 since it doesn't apply to this work. 01554 is for temporary traffic control; 3.1A seems to refer to permanent work.	Will add ASTM for F-shape. Will address comments regarding 3.1 in the future.	Shawn D
10/9/2019 0:56:33	raycook@utah.gov	Ray Cook	02844M	1.1A: Reword and reverse order to " . . . F-shape barrier and constant slope barrier." to be consistent with the rest of the spec (such as 2.6 title).	Implemented	Shawn D

Supplemental Specification
2017 Standard Specification Book

SECTION 02844M

CONCRETE BARRIER

Delete Paragraph 1.1 A and replace with the following:

A. Fabricating and placing precast concrete barriers including ~~New Jersey~~ F-shape and constant slope.

Delete Article 1.3 and replace with the following:

1.3 REFERENCES

A. AASHTO M 111: Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

~~A~~B.. ASTM A 36: Carbon Structural Steel

C. ASTM A 449: Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use

D. ASTM A 572: High-Strength Low-Alloy Columbium-Vanadium Structural Steel

~~B~~E. ASTM C 1315: Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete

F~~C~~. ASTM D 1621: Compressive Properties of Rigid Cellular Plastics

G~~D~~. ASTM D 1777: Thickness of Textile Materials

H~~E~~. ASTM D 6364: Determining Short-Term Compression Behavior of Geosynthetics

I~~F~~. AWS D1.5: Bridge Welding Code

~~G~~J. UDOT Quality Management Plan

Delete Article 2.2 and replace with the following:

2.2 STRUCTURAL STEEL

A. Constant Slope Concrete Barrier:
   1. Connection pin~~s~~, connection loop~~s~~, and stabilization pin~~s~~.
      a. Refer to ASTM A 36.
      b. Galvanize after fabrication according to AASHTO M 111.

B. F-Shape Concrete Barrier:
   1. Connection pin
      a. ASTM A 449, Type 1
      b. Plate washer
         1) ASTM A 572, Grade 50
      b. Galvanize after fabrication according to AASHTO M 111.
   2. Connection loop
      a. ASTM A 36
      b. Galvanize after fabrication according to AASHTO M 111.
   4. Stabilization pin and plate washer
      a. ASTM A 36.
      b. Galvanize after fabrication according to AASHTO M 111.

~~B~~C. Welding ~~–~~
   1. Refer to AWS D1.5.

Delete Article 2.6 and replace with the following:

2.6 PRECAST ~~NEW JERSEY~~F~~-~~ SHAPE AND CONSTANT SLOPE CONCRETE BARRIER

A. Pre-qualify the fabricator as a supplier of precast concrete products according to the UDOT Quality Management Plan: Precast-Prestressed Concrete Structures.

B. Mark each barrier with 1½ inch numbers indicating the date of casting and identification number supplied by the inspector.
   1. Mark “WORK ZONE ONLY” if barrier uses uncoated reinforcement.
   2. Impress ¼ inch deep into the top center of the barrier.

C. Prevent cracking or damage during handling and storage of precast units. Replace units with cracks greater than .007 inch or damaged precast units.

D. Do not ship until:
   1. 28 day compressive strength acquired.

2. Cured and sealed according to Section 03390.
3. Inspected and authorized.

Delete Article 3.2 and replace with the following:

3.2 PRECAST CONCRETE BARRIER – 32 INCH ~~NEW JERSEY~~F~~-~~ SHAPE AND CONSTANT SLOPE CONCRETE BARRIER – 42 INCH

A. Installation includes moving, stockpiling, and placing all barriers.

B. Place seal between each barrier unit so that enough pressure is exerted on the sealing material to form and maintain a permanent bond.

C. Refer to BA Series Standard Drawings.

D. Curing – Refer to Section 03390.

Standards Committee Submittal Sheet

Name of Preparer: Shawn Debenham

Title/Position of Preparer: Roadside Safety Manager

Specification/Drawing/Item Title: CC 9A Grading and Installation Details MFLEAT End Treatment Type H (MASH)

Specification/Drawing Number:

Priority Level (see last page for explanation) 3

Completion of paragraphs A, F, and G are mandatory. Lack of information or insufficient information will result in rejection of agenda item.

NOTES:

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3. Notify the Standards Section immediately of any changes that impact the presentation to include absence of sponsor or delay in presentation.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard or what has caused a new or changed item of interest. **(MANDATORY)**

CC 9: This is a new drawing for the MFLEAT Type H End Treatment that has passed MASH testing criteria. This is the only MASH tested flared end treatment on the market today. This will provide another option for designers to use other than the MASH Type G End Treatments.

B. Measurement, Payment, Acceptance, and Documentation:

1. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.
Once the proposed drawings have been approved, the M&P document associated with specification 02843 Crash Cushions and Barrier End Treatments will be modified to reflect the changes within the drawings.

2. How is Acceptance and Documentation handled? Existing (from the acceptance and documentation document), modified, or new acceptance and documentation to be included with all Standard Specifications or Supplemental Specifications. Include Contractor Submittals, Inspection Elements, and Documentation.
No change to Measurement, Payment, Acceptance and documentation.

C. Stakeholder Notification for AGC and ACEC:

Provide by e-mail, the AGC and ACEC Standards Committee member a copy of all pertinent information relating to the specification or drawing. Detail all responses on the Standards Committee Review Comments Form.

Note: There is a two-week response time set for this item.

Refer to the Standards Committee Web site, http://www.udot.utah.gov/go/standardscommittee to "Standards Committee Members" for the respective e-mail addresses.

AGC: (Document comments on the Comment Form)

ACEC: (Document comments on the Comment Form)

D. Stakeholders:
Document the stakeholders contacted on the Standards Committee Review Comments Form, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change.
Stakeholders:

Note: There is a two-week response time set for this item to allow Stakeholders time to process and respond to coordination requests. All areas should try to

complete review and comment as soon as possible but within two weeks. Advise Stakeholder if less time is given the Stakeholder to complete this requirement.

Contact all applicable UDOT personnel, FHWA representative for the type item being reviewed, contractors and consultants contacted in addition to those contacted in paragraph "C" above, suppliers, manufacturers and any others as deemed appropriate. Include all those contacted on the Standards Committee Review Comments Form.

FHWA (Accomplished as part of the two-week process before submitting to the Standards section for inclusion on the Standards Committee agenda.) This is in addition to the requirements of UDOT Policy 08A5-01, procedure 08A5-01.3.

E. Other impacted areas, systems, or personnel. Consider all impacts and possible changes to these areas during the preparation process. Coordinate with all appropriate areas for the respective item. List all impacts and action taken.

1. Minimum Sampling and Testing Requirements

   No Change

2. Business Systems (Electronic Bid System, Project Development Business System, Electronic Program Management, Computer-Aided Drafting and Design, etc.)

   No Change

3. Implementation Plan (Provide detailed instructions on how the subject item will be implemented to include notification of all interested parties and training requirements.) **E-mail notice will be sent as part of the Standards Section's publishing process.**

4. What additional systems and documents need modification to reflect this change?

   No Change

F. Costs? (Estimates are acceptable.)

1. Cost Impact to the Department (For example, unit bid price, change in quantity, total scope impacts in year, increase in contractor's overhead or mobilization).

$2,400.00 is the estimated cost of the system to include installation. This option is $500.00 cheaper than the MASH Type G system. The MFLEAT will be a good option if site conditions allow the installation of the system.

2. Operational (For example, maintenance, materials, equipment, labor, administrative, programming).

No Change

3. Life cycle cost.

No Change

G. Benefits? Provide details that can be used to complete a Cost – Benefit Analysis. Estimates are acceptable. What is the benefit of making this change if no cost is involved? **(MANDATORY)**

Currently no costs are associated with the proposed change because no costs are reported separately as this would be associated within the crash cushion and end treatment installation. Refer to paragraphs H, Safety Impacts and I, History below for additional benefit information.

H. Safety Impacts?

Results of MASH tests show improved crash –test performance at 31 inches regarding the capacity of the end treatments to contain and redirect vehicles with higher center-of-gravity such as pickup trucks and SUVs.

These changes will help ensure that the systems are installed correctly and will function as designed.

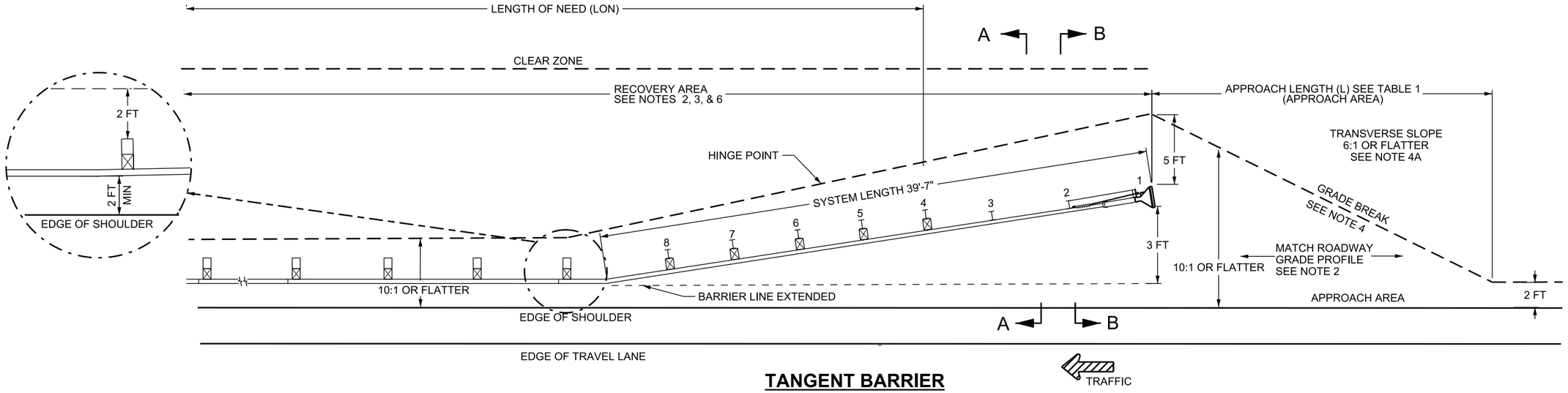
I. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

FHWA January 7, 2016 Memorandum HSST requires w-beam terminals meet the 2016 edition of MASH criteria by December 31, 2018. UDOT is implementing MASH tested devices as they become available on the market.

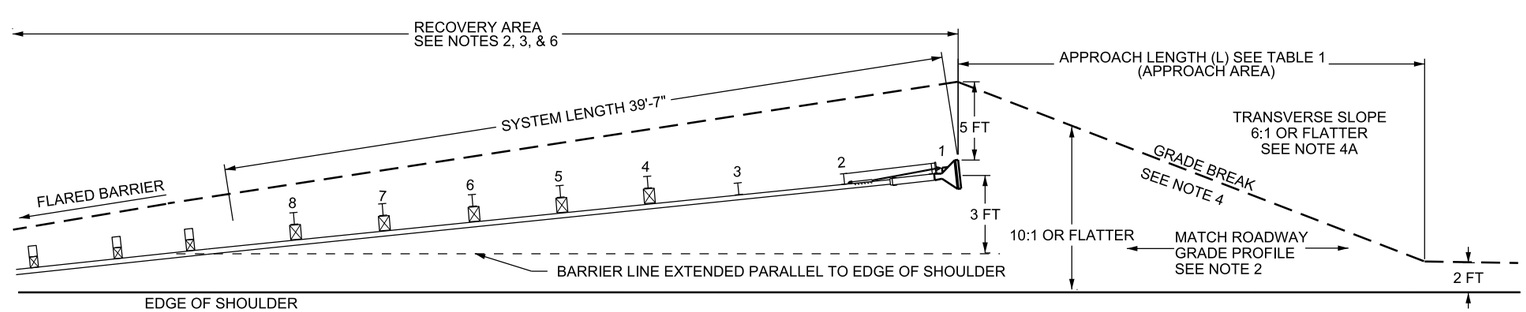
During the June 2016 Standard Committee meeting, the use of MASH only end treatments for W-beam installation after January 1 2017 was proposed and approved.

Timestamp	Email Address	REVIEWER	DRAWING #, SECTION #, ARTICLE #, ETC.	COMMENT	RESPONSE	RESPONSE BY
9/23/2019 9:34:30	kbarrett@utah.gov	Kelly Barrett	CC 09	No Comment		
9/23/2019 10:48:03	kthornock@utah.gov	Kirk Thornock	CC 09	No comments, options are always great		
9/26/2019 13:44:10	jtremaine@utah.gov	Janice Tremaine	CC 9 Drawing	No Comment		
9/26/2019 18:27:32	branden@utah.gov	Branden Anderson	CC 09	No Comment		
9/27/2019 12:20:15	rarnell@utah.gov	Rhett Arnell	CC 9	No Comment		
9/30/2019 9:15:39	dpage@utah.gov	Danny Page	CC9	No Comments		
9/30/2019 10:57:48	brettslater@utah.gov	Brett Slater	CC9	In the upper left in the blow up of the edge treatment you call out see Note F, should that be Note 1?	Moved call out to DM layer.	Shawn D.
9/30/2019 11:14:04	brettslater@utah.gov	Brett Slater	CC9	On Typical Section A-A and B-B why does it need to be a 6:1 or flatter in the clear zone recovery area could this be a 4:1	6:1 slope provides a safer environment for the traveling public.	Shawn D.
9/30/2019 15:55:11	fdoehring@utah.gov	Fred Doehring	CC9	Section B-B 5' offset from post to grade break can't be right. That distance is varying from 5' at the head to 2' at the angle point. Should show a Varies.	Implemented	Shawn D.
9/30/2019 15:58:08	fdoehring@utah.gov	Fred Doehring	CC-9 Flared Barrier detail	I don't understand the "Barrier line extended parallel to edge of shoulder" note. The dashed line seems to be an arbitrary distance from the edge of shoulder. It doesn't appear to be an extension of anything.	Added system length dimension to clarify where the line extension starting point.	Shawn D.
9/30/2019 16:19:55	fdoehring@utah.gov	Fred Doehring	CC-9 Plan views	I don't understand the label "transition to existing grade" along the edge of the pad. The transverse slope is 10:1 on one side and 6:1 on the other side. Neither of those is the existing grade. Or, is it referring to the longitudinal grade of the existing ground?	Changed to grade break.	Shawn D.
9/30/2019 17:15:49	kentalbot@utah.gov	Ken Talbot	CC9	Section B-B does not show blocking on the post, but the plan view shows the #4 post with blocking - please clarify	Corrected section call out.	Shawn D.
9/30/2019 17:17:06	kentalbot@utah.gov	Ken Talbot	CC9	Note 4 says to construct the platform "when the space is available". What is the direction if the space for the platform is not available?	You do not use a Type H because there is not enough room to build the pad for a flared barrier system. Type G system would be used in that case.	Shawn D.
10/1/2019 7:31:36	GBLACKWELDER@utah.gov	Glenn Blackwelder	all	No comments		
10/2/2019 16:47:54	jcorney@utah.gov	James Corney	CC 9	Tangent Barrier and Flared Barrier Details, Approach Area, Match Roadway Grade Profile: Singular- "See Note 2"	Corrected	Shawn D.
10/2/2019 16:48:05	jcorney@utah.gov		CC9	Tangent Barrier Detail: Add "Traffic" to direction arrow	Implemented	Shawn D.
10/2/2019 16:48:15	jcorney@utah.gov		CC9	Tangent Barrier Detail: Move "Barrier Line Extended" arrow to the dashed line	Implemented	Shawn D.
10/2/2019 16:48:24	jcorney@utah.gov		CC9	Tangent Barrier Detail, enlarged detail: What is the reference to Note F?	Moved to DM Layer	Shawn D.
10/2/2019 16:48:36	jcorney@utah.gov		cc9	Typical Sections: What is the 3:1 Max and 6:1 Max? Note C1 which kind of explained this has been deleted.	Design Only Notes shown on the DM Sheets provides an explination.	Shawn D.

10/2/2019 16:48:46	jcorney@utah.gov		CC9	Typical Section B-B: 5 ft dimension behind the post is not clearly defined as constant in the Tangent Barrier detail. If this is 5 feet then the dimension needs to be shown as a measurement behind post 4 with a angle point in the dashed line. Note that 5 feet behind the post is not the same distance as 5 feet behind the end treatment.	Changed BB to Varies. Will verify and make changes.	Shawn D.
10/2/2019 16:48:56	jcorney@utah.gov		CC9	All Details: Why is "See notes 6, 2, & 3" repeated in every detail? If it goes everywhere then it should just be in the notes. These notes are also repeated twice in typical section A-A. Finally, if these callouts are to remain please sequence the numbers in ascending order: 2, 3, & 6.	Call out adjusted and only shown on slopes.	Shawn D.
10/2/2019 16:49:05	jcorney@utah.gov		CC9	Note 5: 4ft offset is shown for A and B, should this be 3ft with new details?	Changed to 3 ft.	Shawn D.
10/2/2019 16:49:16	jcorney@utah.gov		CC9	Note 7 and Title: Isn't this still a Type G end treatment?	No, the M FLEAT a Type H. Type H is the UDOT flared barrier end treatment. Type G is a tangent system.	Shawn D.
10/7/2019 17:04:30	dlahusen@avenueconsultants.com	ACEC	CC 09	No Comment.		
10/9/2019 0:17:57	raycook@utah.gov	Ray Cook	CC 09	Tangent Barrier detail refers to Note F which does not exist. “Notes 2” should be “Note 2.” Typical Sections – Delete “Limit” from “Clear Zone” Revise Note 2: “Install system after slope preparation is complete.” (Slope preparation is not part of the system installation work.)	Implemented	Shawn D.



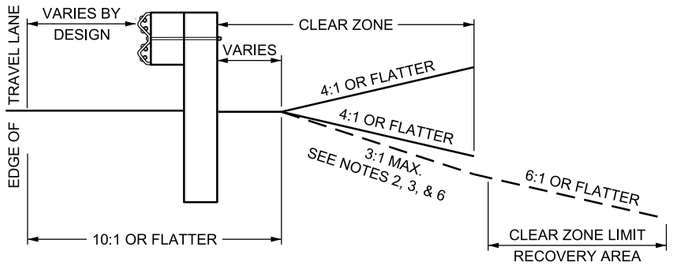
TANGENT BARRIER



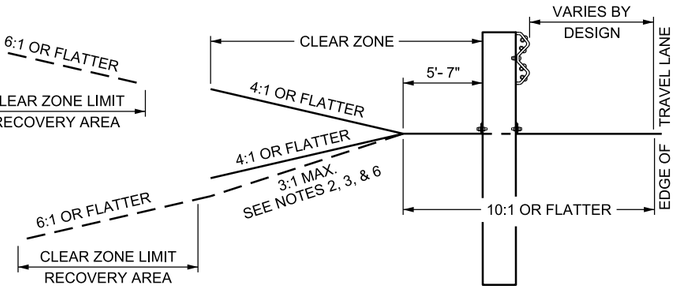
FLARED BARRIER

SEE NOTE 5

TABLE 1	
SPEED MPH	MIN LENGTH (L)
LESS THAN 40	50 FT
40 TO 55	70 FT
60 TO 80	100 FT



TYPICAL SECTION A-A



TYPICAL SECTION B-B

NOTES:

1. REFER TO MANUFACTURER'S SPECIFICATIONS FOR POST, RAIL ELEMENT, AND POST TO RAIL CONNECTION REQUIREMENTS. HAVE SHOP DRAWING AVAILABLE ON SITE FOR REFERENCE DURING INSTALLATION.
2. INSTALL SYSTEM AFTER SITE SLOPE PREPARATION IS COMPLETE.
3. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS OR HAZARDS.
4. CONSTRUCT PLATFORM AS REQUIRED WHEN THE SPACE IS AVAILABLE EVEN IF THE PLATFORM EXTENDS BEYOND THE CLEAR ZONE REQUIREMENTS. SEE STD DWG CC 8C FOR EXCEPTIONS.
   A) CONSTRUCT 6:1 OR FLATTER SLOPE FOR TRANSVERSE SLOPE FROM APPROACH PAD.
5. SYSTEM OFFSET:
   A. INSTALL SYSTEM WITH A 3 FT OFFSET WHEN USED WITH A TANGENT BARRIER SYSTEM.
   B. INSTALL SYSTEM WITH A 3 FT OFFSET, FROM BARRIER LINE EXTENDED PARALLEL TO EDGE OF SHOULDER WHEN USED WITH A FLARED BARRIER SYSTEM FROM ZERO TO 14:1 FLARE RATE.
   C. INSTALL SYSTEM DIRECTLY IN LINE WITH BARRIER WHEN BARRIER IS FLARED AT 13:1.
6. DO NOT PLACE SIGNS, POSTS, OR OTHER HAZARDS IN APPROACH AREA. USE BREAKAWAY SIGNS OR POSTS WHEN PLACED IN RECOVERY AREA, AND MAINTAIN A MINIMUM 10 FT CLEARANCE TO THE SIDE AND 65 FT FROM THE IMPACT HEAD OF THE SYSTEM. MITIGATE POTENTIAL HAZARDS IN THE RECOVERY AREA.
7. MOUNT OBJECT MARKER POST PER STD DWG CC 1 END TREATMENT TYPE H.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL	OCT. 31, 2019 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	OCT. 31, 2019 DATE
DEPUTY DIRECTOR	

GRADING AND
INSTALLATION DETAILS
MFLEAT
END TREATMENT TYPE H
(MASH)

STANDARD DRAWING TITLE

STD. DWG. NO.
CC 9

Standards Committee Submittal Sheet

Name of Preparer: Shawn Debenham

Title/Position of Preparer: Roadside Safety Manager

Specification/Drawing/Item Title: BA 1,2 & 3 Series (F-Shape Concrete Barrier)

Specification/Drawing Number:

Priority Level (see last page for explanation) 3

Completion of paragraphs A, F, and G are mandatory. Lack of information or insufficient information will result in rejection of agenda item.

NOTES:

1. All Submittal Sheets must be completed and sent to the Standards Section by meeting the applicable Coordination due date. (See https://www.udot.utah.gov/StandardsCommitteeScheduleDates)
2. The Preparer of the Submittal Sheet or the Standards Committee member (or authorized substitute) responsible for the submittal must be present at the Standards Committee or Modified Process meeting and capable of discussing and answering all questions related to the submittal. The item will be postponed to a later meeting if one of these people is not present.
3. Notify the Standards Section immediately of any changes that impact the presentation to include absence of sponsor or delay in presentation.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard or what has caused a new or changed item of interest. **(MANDATORY)**

The F-shape provides improved impact performance over the New Jersey shape. Full- scale crash testing indicates that vehicles experience less climb and remain more stable during impacts with barriers having an F-shape profile compared to those with a New Jersey profile. To meet MASH requirements the current New Jersey precast concrete barrier design has been replaced with the F-Shape precast concrete barrier design.

The following drawings have been entirely revised:

BA 1A2: Concrete Barrier General Notes and Standard Details.
BA 2A: Precast Concrete Barrier 32 Inch, F-Shape
BA 2B: Precast Concrete Barrier 32 Inch, F-Shape Sloped End Section

BA 2D: Cast-In-Place Barrier 32 Inch F-Shape, 42 Inch Constant Slope Transition.
BA 2E: Precast Concrete Half Barrier 32 Inch.
BA 3J: Precast Concrete Constant Slope Barrier 42 Inch, 32 Inch F-Shape Transition.
BA 3K5: Cast-In-Place Concrete Half Barrier 42 Inch Constant Slope, 32 Inch F-Shape Transition.
BA 3Q2: Cast-In-Place Concrete Barrier 54 Inch Constant Slope, 32 Inch F-Shape Transition.

New drawings are as follows:

BA 1A3: Concrete Barrier General Notes and Standard Details.
BA 1F1: Concrete Barrier F-Shape Installation.
BA 1F2, BA 1F3 & BA 1F4: Free Standing Barrier F-Shape to Cast-In-Place Barrier Transition.
BA 2C: Precast Concrete Barrier 32 Inch F-Shape, New Jersey Transition.

Modified existing drawing:
BA 1A1: Replaced the word Jersey with F-Shape within the notes.
BA 1B: Removed Jersey Shape barrier. Installation requirements for F-Shape will be found in Std. Dwg. BA 1F1.
BA 1C: Removed Jersey Shape barrier for all installation except "Rock Fall Considerations and Retaining Barrier" options. Removed Placement with Barrier Offset Detail until such time this option has been MASH tested. Installation requirements for F-Shape will be found in Std. Dwg. BA 1F1.
BA 1D: Modified Typical Application Detail for new stabilization pin installation requirements.

The following will be deleted:

BA 3I1 & BA 3I2: Precast 42 Inch Constant Slope Barrier with Small Sign Base. This sign base design is not crash worthy. SN-14 will be used in its place.

B. Measurement, Payment, Acceptance, and Documentation:

1. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.
Once the proposed drawings have been approved, the M&P document associated with specification 02844 Concrete Barrier will be modified to reflect the changes within the drawings.

2. How is Acceptance and Documentation handled? Existing (from the acceptance and documentation document), modified, or new acceptance and documentation to be included with all Standard Specifications or Supplemental Specifications. Include Contractor Submittals, Inspection Elements, and Documentation.
No Change: Construction requirements have not changed due to note changes.

C. Stakeholder Notification for AGC and ACEC:

Provide by e-mail, the AGC and ACEC Standards Committee member a copy of all pertinent information relating to the specification or drawing. Detail all responses on the Standards Committee Review Comments Form.

Note: There is a two-week response time set for this item.

Refer to the Standards Committee Web site, http://www.udot.utah.gov/go/standardscommittee to "Standards Committee Members" for the respective e-mail addresses.

AGC: (Document comments on the Comment Form)

ACEC: (Document comments on the Comment Form)

D. Stakeholders:
Document the stakeholders contacted on the Standards Committee Review Comments Form, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change.
Stakeholders:

Note: There is a two-week response time set for this item to allow Stakeholders time to process and respond to coordination requests. All areas should try to complete review and comment as soon as possible but within two weeks. Advise Stakeholder if less time is given the Stakeholder to complete this requirement.

Contact all applicable UDOT personnel, FHWA representative for the type item being reviewed, contractors and consultants contacted in addition to those contacted in paragraph "C" above, suppliers, manufacturers and any others as deemed appropriate. Include all those contacted on the Standards Committee Review Comments Form.

FHWA (Accomplished as part of the two-week process before submitting to the Standards section for inclusion on the Standards Committee agenda.) This is in addition to the requirements of UDOT Policy 08A5-01, procedure 08A5-01.3.

E. Other impacted areas, systems, or personnel. Consider all impacts and possible changes to these areas during the preparation process. Coordinate with all appropriate areas for the respective item. List all impacts and action taken.

1. Minimum Sampling and Testing Requirements

   No Change

2. Business Systems (Electronic Bid System, Project Development Business System, Electronic Program Management, Computer-Aided Drafting and Design, etc.)

   No Change

3. Implementation Plan (Provide detailed instructions on how the subject item will be implemented to include notification of all interested parties and training requirements.) **E-mail notice will be sent as part of the Standards Section's publishing process.**

4. What additional systems and documents need modification to reflect this change?
   No Change

F. Costs? (Estimates are acceptable.)

1. Cost Impact to the Department (For example, unit bid price, change in quantity, total scope impacts in year, increase in contractor's overhead or mobilization).

It is estimated that the costs of 32" precast barrier will increase 15 percent. The new design requires 20 percent more concrete per lineal foot than the Jersey design. The fabricators will pass on retooling expenses to the Department through increased barrier costs.

2. Operational (For example, maintenance, materials, equipment, labor, administrative, programming).

No Change: F-Shape design will be handled in the same manner as the Jersey design. The F-Shape 15 feet barrier length design weighs 3.4 tons which can be transported and installed with existing equipment. The barrier is placed in the same manner as the Jersey design.

3. Life cycle cost.

No Change: F-Shape design will perform in the same manner in regards to life cycle costs as the Jersey design.

G. Benefits? Provide details that can be used to complete a Cost – Benefit Analysis. Estimates are acceptable. What is the benefit of making this change if no cost is involved? **(MANDATORY)**
Currently no costs are associated with the proposed change because no costs are reported separately as this would be associated within the barrier installation. Refer to paragraphs H, Safety Impacts and I, History below for additional benefit information.

H. Safety Impacts?

The F-Shape improves safety of the traveling public by reducing vehicle climb in sever impacts and improves post-crash trajectories, reduces the roll angle of impacting trucks and other vehicles with high centers-of-gravity. Also see Part A.

I. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

See Part A

Priority Explanation

Enter the appropriate priority in the box on the first page of the document.

Review Standards Committee Policy 08A-05 and related Procedure 08A5-01.5 prior to determining the Priority.

Priority 1 Upon posting, this impacts all projects in construction and design with a Change Order, Addenda, and immediate change to projects being advertised.

Priority 2 Upon posting, this impacts projects being advertised.

Priority 3 Upon posting, the approved standard takes effect **four weeks** later for projects being advertised.

Priority 4 Applicable to a new edition of the Standards only.

Timestamp	Email Address	REVIEWER	DRAWING #, SECTION #, ARTICLE #, ETC.	COMMENT	RESPONSE	RESPONSE BY
9/23/2019 7:33:02	bbyeates@utah.gov	Brad	BA 1A1	Sorry, I didn't catch this in my initial review, but should the end portion of the drawing title be 1 of 3 rather than 1 of 2?	Changed Title to 1 0f 3.	Shawn D.
9/23/2019 9:36:44	kbarrett@utah.gov	Kelly Barrett	BA Drawings F-Shape	No Comment		
9/23/2019 10:48:40	kthornock@utah.gov	Kirk Thornock	BA Drawings F-Shape	No comments.		
9/26/2019 8:30:01	nschellenberg@genevarock.com	Nathan Schellenberg	BA Drawings	Many contractors currently have millions of dollars of inventory of barrier meeting the current specification. With the change in specification, contractors with barrier in inventory will have significant financial losses with the value of the existing barrier effectively going to zero. If the barrier type is going to change, the existing barrier should be allowed indefinitely as long as it was manufactured before the new barrier specification goes in to effect.	This change is required by FHWA and AASHTO to meet MASH crash testing criteria and as such 01554 Specification was changed during the August Standards Meeting. The change provides a 3 year period for the New Jersey barrier to be used within work zones.	Shawn D.
9/26/2019 13:45:50	jtremaine@utah.gov	Janice Tremaine	BA Drawings	No comment		
9/26/2019 18:25:55	ashford@wadsbro.com	Ashford Galbreath	BA 1E submittal sheet	Cost information omits the additional cost of replacing the inventories of temporary barrier already owned by contractors in the valley.	It is expected that the contractors will pass on expenses to the Department through increased barrier costs.	
9/26/2019 18:30:32	ashford@wadsbro.com	Ashford Galbreath	Type f Barrier Submittal sheet	The operational impact on maintenance is much greater than is stated. replacing a damaged section of jersey barrier with the F shape will create a snagging hazard due to the difference in section. This will lead to increased maintenance costs and reduced safety for the public.	Department through increased barrier costs.	Shawn D.
9/27/2019 12:26:50	rarnell@utah.gov	Rhett Arnell	BA Drawings F-Shape	No Comment		
9/30/2019 9:20:22	dpage@utah.gov	Danny Paeg	BA 1A2 -	BA 1A2 - Sheet 2 of 3 Barrie - See note 10, there is no note 10	Changed to Note 7.	Shawn D.
9/30/2019 11:39:42	branden@utah.gov	Branden Anderson	BA Drawaings	No comment		
10/1/2019 7:38:30	GBLACKWELDER@utah.gov	Glenn Blackwelder	BA 1C Retaining Barrier	Note reads "32 INCH NEW F-SHAPE" should be "32 INCH F-SHAPE"?	"New" deleted.	Shawn D.
10/2/2019 16:05:08	kentalbot@utah.gov	Ken Talbot	BA 1A2	Key detail - might want to check with the pre-casters to find out the best way to show this detail, talking about the 22.5 degree measurement as opposed to showing the recessed measurement parallel to the 5.5" measurement. Maybe new forms are already like this so it doesn't matter?	I have sent this detail to all the local pre-casters prior to the proposed change and they have not had an issue with the design. Also this detail mirrors Idaho and Oregon Std Dwg design.	Shawn D.
10/2/2019 16:05:30	kentalbot@utah.gov	Ken Talbot	BA 1B	Replace references to PCCP with Concrete Flatwork.	Implemented.	Shawn D.
10/2/2019 16:06:11	kentalbot@utah.gov	Ken Talbot	BA 1C	Permissable Retained Soil Height table, add F-shape?	Change implemented	Shawn D.
10/2/2019 16:06:43	kentalbot@utah.gov	Ken Talbot	BA 1C	Barrier Paving Detail - Plan View: Change PCCP to flatwork	Implemented.	Shawn D.
10/2/2019 16:07:05	kentalbot@utah.gov	Ken Talbot	BA 1C	In the details with the MSE walls, show the continuation of the pavement section out to the wall coping, delete reference to note 4 and 4" min PCCP or HMA note.	Barrier Paving Detail is to be used for the pavement section. PCCP replaced with flatwork.	Shawn D.
10/2/2019 16:07:27	kentalbot@utah.gov	Ken Talbot	BA 1C	Replace references to PCCP with Concrete Flatwork.	Implemented.	Shawn D.
10/2/2019 16:07:53	kentalbot@utah.gov	Ken Talbot	BA 1F1	8" Min Concrete pavement (Median Barrier Pinned, Barrier Pinned to Concrete Pavement, & Free Standing Barrier): 1 - Why 8" Min concrete? That is pretty thick, seems like 4 inch would be fine. 2 - Call out flatwork instead of pavement since pavement implies dowel bars, tie bars etc.	Changed Free Standing Barrier pad requirement to 4" flatwork or HMA. 1 - TRN. 610213-01-1 requires 8" min concrete for pinned barrier. To deviate from the test report would place the Department and the traveling public at risk.. 2 - PCCP changed to flatwork.	Shawn D.
10/2/2019 16:09:50	kentalbot@utah.gov	Ken Talbot	BA 1F1	Why are the distances from the edge of barrier to the obstruction different between the Barrier Pinned to Concrete and the Barrier Pinned to Asphalt details?	Barrier deflection requirements are listed according to Crash Test Report No:405160-25-1 & 610231-01	Shawn D.

10/2/2019 16:10:24	kentalbot@utah.gov	Ken Talbot	BA 1F1	Is the stabilization pin in the Barrier Pinned to Asphalt Pavement detail to scale? Show in all the other details.	21 1/4" stabilization pin required for concrete pavement, 48" stabilization pin required for HMA, details depict the correct installation requirements.	Shawn D.
10/2/2019 16:10:50	kentalbot@utah.gov	Ken Talbot	BA 1F1	In the details with the MSE walls, are the distances between the back of barrier and the front of the MSE panels/soil retaining face taking into account the length of the stabilization pin?	Yes. That is the reason for requiring 8" concrete barrier pad with the required 21 1/4" stabilization pin as shown.	Shawn D.
10/2/2019 16:11:19	kentalbot@utah.gov	Ken Talbot	BA 1F1	In the details with the MSE walls, show the continuation of the pavement section out to the wall coping, delete reference to note 8 and 8" concrete pavement	Barrier pad must be a 8" thick concrete pad. Pavement type extending to shoulder is the designers choice be it hma or concrete. Note 8 references the Barrier Paving Detail that requires areas less than 4 ft wide to be paved. Note 8 will remain.	Shawn D.
10/2/2019 16:11:42	kentalbot@utah.gov	Ken Talbot	BA 1F1	What is the purpose of the Temporary Transition Cap? How temporary is temporary?	The temporary transition cap is to be used in work zones only.	Shawn D.
10/2/2019 16:12:39	kentalbot@utah.gov	Ken Talbot	BA 1F2	8" Min Concrete pavement (Concrete Pavement Condition): 1 - Why 8" Min concrete? That is pretty thick, seems like 4 inch would be fine. 2 - Call out flatwork instead of pavement since pavement implies dowel bars, tie bars etc.	TRN. 610213-01-1 requires 8" min concrete pad for pinned barrier. To deviate from the test report would place the Department and the traveling public at risk. PCCP Pavement changed to flatwork.	Shawn D.
10/2/2019 16:13:03	kentalbot@utah.gov	Ken Talbot	BA 1F2	Be consistent between the concrete and asphalt details in showing the length of the stabilization bars into the ground	Details match test report documents. See line 21.	Shawn D.
10/2/2019 16:13:35	kentalbot@utah.gov	Ken Talbot	BA 1F2	Note 1 - on the surface this seems like a no-brainer note which makes me think there was something more intended here. Is there?	Note is in place to match the note formats used throughout the BA 1,2 & 3 series drawings.	Shawn D.
10/2/2019 16:14:22	kentalbot@utah.gov	Ken Talbot	BA 1F3	8" Min Concrete pavement (Concrete Pavement Condition): 1 - Why 8" Min concrete? That is pretty thick, seems like 4 inch would be fine. 2 - Call out flatwork instead of pavement since pavement implies dowel bars, tie bars etc.	TRN. 610213-01-1 requires 8" min concrete pad for pinned barrier. To deviate from the test report would place the Department and the traveling public at risk. PCCP Pavement changed to flatwork.	Shawn D.
10/2/2019 16:13:57	kentalbot@utah.gov	Ken Talbot	BA 1F2	Are notes 2 and 8 saying the same thing?	No. Note 2 is referring to the hardware installation requirement. Note 8 is referring to the barrier layout requirement.	Shawn D.
10/2/2019 16:14:48	kentalbot@utah.gov	Ken Talbot	BA 2A	Elevation view - Scupper calls out Note B - where is that?	Deleted Note B call out.	Shawn D.
10/2/2019 16:15:05	kentalbot@utah.gov	Ken Talbot	BA 2A	Is an arrow with "Ahead Station" needed like in BA 1A2?	No. Note 2 is references to BA 1A2 for barrier connection type.	Shawn D.
10/2/2019 16:15:33	kentalbot@utah.gov	Ken Talbot	BA 2C	Elevation view - Scupper calls out Note B - where is that?	Deleted Note B call out.	Shawn D.

10/2/2019 16:15:51	kentalbot@utah.gov	ken Talbot	BA 2C	Replace references to PCCP with Concrete Flatwork.	There are no reference to PCCP on this sheet.	Shawn D.
10/2/2019 16:17:18	kentalbot@utah.gov	Ken Talbot	BA 2D	Replace references to PCCP with Concrete Flatwork.	Changed to PCCP Roadway Panel Only. Next February, a foundation design will be implemented for placement on hma or flatwork.	Shawn D.
10/2/2019 16:17:38	kentalbot@utah.gov	Ken Talbot	BA 2D	Consider removing UTBC layer in elevation view	PCCP requirement remains.	Shawn D.
10/2/2019 16:18:06	kentalbot@utah.gov	Ken Talbot	BA 2E	Replace references to PCCP with Concrete Flatwork.	Replaced PCCP with AA(AE) concrete or hma.	Shawn D.
10/2/2019 16:18:22	kentalbot@utah.gov	Ken Talbot	BA 3J	Elevation view - Scupper calls out Note B - where is that?	Deleted Note B call out.	Shawn D.
10/2/2019 16:18:49	kentalbot@utah.gov	Ken Talbot	BA 3K5	Consider removing UTBC layer in elevation view	PCCP requirement remains.	Shawn D.
10/2/2019 16:19:09	kentalbot@utah.gov	Ken Talbot	BA 3K5	Replace references to PCCP with Concrete Flatwork.	Changed to PCCP Roadway Panel Only. Next Febuary, a foundation design will be implemnted for placement on hma or flatwork.	Shawn D.
10/2/2019 16:19:26	kentalbot@utah.gov	Ken Talbot	BA 3Q2	Replace references to PCCP with Concrete Flatwork.	Changed to PCCP Roadway Panel Only. Next Febuary, a foundation design will be implemnted for placement on hma or flatwork.	Shawn D.
10/2/2019 16:19:44	kentalbot@utah.gov	Ken Talbot	BA 3Q2	Consider removing UTBC layer in elevation view	PCCP requirement remains.	Shawn D.
10/3/2019 12:30:44	jcorney@utah.gov	James Corney	BA 1A2	Connection Loop: 6" Min dimension needs to be parallel to the steel if it is dimensioning the length, or is this supposed to show a 6" vertical offset? Either way it is not clear.	Detail has been updated to show a side and top view. This adds more clarity than the previous isometric.	David Simmons
10/3/2019 12:30:56	jcorney@utah.gov		BA 1A2	Connection Loop: Indicate the inside radius of the loop end (1 inch per similar BA 1A3)	Inside radius is 1". Added radius to detail.	David Simmons
10/3/2019 12:31:07	jcorney@utah.gov		BA 1A2	Barrier Seal Detail: Change note reference to Note 7	Updated	Shawn D.
10/3/2019 12:31:18	jcorney@utah.gov		BA 1A2	Note 1: Note does not mention steel for connection loop	Connection loop is A36. Added material type to Note 1.	David Simmons
10/3/2019 12:31:30	jcorney@utah.gov		BA 1A3	Connection Loop: Who not use the same connection loop as BA 1A2? The 45 degree end solves the Type A Type B problem, so we would go from 3 types of connection loops to 1.	This standard has not been changed from 2012. We do not have testing documents to rely on in order to make any changes.	Shawn D.
10/3/2019 12:31:41	jcorney@utah.gov		BA 1A3	Note 1: Why is the steel for the SS diffferent from the F shape?	Designs are based on crash test documents. F-shape design being the most recient is based on the Roadside Safety Pooled Fund crash tested documents which differs from what the precast constant slope design was based on back in 2012.	Shawn D.
10/3/2019 12:31:51	jcorney@utah.gov		BA 1C	Rock Fall and Retaining Barrier Details: Showing the Jersey Shape not F-Shape	Changed to F-shape.	Shawn D.
10/3/2019 12:32:02	jcorney@utah.gov		BA 1C	Single Stage MSE detail: Change coping callout to "Shape shown is schematic. See plans for coping details."	Implemented	Shawn D.
10/3/2019 12:32:14	jcorney@utah.gov		BA 1C	Two Stage MSE detail: Change coping callout to "Shape shown is schematic. See plans for coping details."	Implemented	Shawn D.
10/3/2019 12:32:22	jcorney@utah.gov		BA 1C	Retained Soil Table: Change reference from Jersey to F-Shape	Implemented	Shawn D.
10/3/2019 12:32:32	jcorney@utah.gov		BA 1D	Plan: Contour lines are too dark, show thinner or grey	Implemented	Shawn D.
10/3/2019 12:32:42	jcorney@utah.gov		BA 1D	LON Formulas, Backslope 3:1: >= 50 is using an "O" instead of a zero	Implemented	Shawn D.

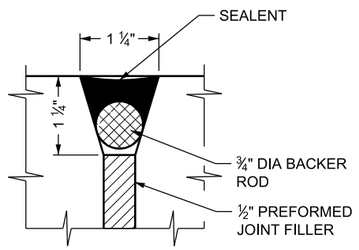
10/3/2019 12:32:52	jcorney@utah.gov		BA 1D	Note 5: Turn final sentence into new note and add pins to it "6. See STD. DWG. BA 1F2 for barrier layout and stabilization pin requirements."	Implemented	Shawn D.
10/3/2019 12:33:04	jcorney@utah.gov		BA 1D	Typical Elevation: Show pins for HMA (3 pins per piece) and change callout to: "Stabilization pins required at the first three and last three sections of barrier in permanent applications as shown, typ. See note 6." And delete the identical note from the right half of the detail.	Implemented except for showing pins for aspalt because hma requires addtional pins. Also added note below Typical Elevation: "F-shape barrier shown. Precast Constant Slope similar.	Shawn D.
10/3/2019 12:33:14	jcorney@utah.gov		BA 1D	Typical Elevation: Draw a leader to the single pin on the third section with "See note 5, typ."	Implemented	Shawn D.
10/3/2019 12:33:27	jcorney@utah.gov		BA 1E	This sheet is addressed in a different item.	Thank you	Shawn D.
10/3/2019 12:33:37	jcorney@utah.gov		BA 1F1	Median Barrier Pinned: Reword "Less than 12'…" dimension to "Stabilization pins required when less than 12' " And align Dimension on both sides.	Implemented	Shawn D.
10/3/2019 12:33:48	jcorney@utah.gov		BA 1F1	Barrier Pinned to Concrete: Why is the obstruction offset 1'-11" here and not 1'6" like asphalt pin?	Deflection provided according to TRN: 610231-01	Shawn D.
10/3/2019 12:33:59	jcorney@utah.gov		BA 1F1	Barrier Pinned to Concrete: Whu is the distance to the slope 9" min here and not 1'-0" min?	Min concrete pavement provided according to TRN: 610231-01	Shawn D.
10/3/2019 12:34:09	jcorney@utah.gov		BA 1F1	Single Stage MSE detail: Change coping callout to "Shape shown is schematic. See plans for coping details."	Implemented	Shawn D.
10/3/2019 12:34:19	jcorney@utah.gov		BA 1F1	Two Stage MSE detail: Change coping callout to "Shape shown is schematic. See plans for coping details."	Implemented	Shawn D.
10/3/2019 12:34:29	jcorney@utah.gov		BA 1F3	Shoulder, Plan, Carriage Bolt callout: Change to "5/8" DIA x 3" carriage bolt with nut" and Delete note 8.	Callout changed and Note 8 deleted.	David Simmons
10/3/2019 12:34:39	jcorney@utah.gov		BA 1F3	Guardail bolt: Change guardrail bolt callouts in plans (shoulder and median) to "Guardrail bolt with nut and rectangular washer" full note is correctly shown in traffic side elevation	Guardrail bolt callouts changed in the plan views as recommended.	David Simmons
10/3/2019 12:34:50	jcorney@utah.gov		BA 1F3	Temporary Transition Cap: Delete reference for note 10 from plan views and field side elevation (shoulder and median) Reference is correctly shown in traffic side elevation view.	Note 10 reference removed as recommended.	David Simmons
10/3/2019 12:35:00	jcorney@utah.gov		BA 1F3	7/8" DIA bolt: Change 7/8" dia bolt callout to "Structural hex bolt with nut and washer, typ 10 places. See note 3" in Traffic side Elevation views. The Structural hex bolt is a named item with its own detail, and that detail refers to note 6.	Callout changed as recommended.	David Simmons
10/3/2019 12:35:11	jcorney@utah.gov		BA 1F3	7/8" DIA bolt: Change 7/8" dia bolt callout to "Structural hex bolt with nut and washer" in plan views (shoulder and median) and Field side elevation view.	Callout changed as recommended.	David Simmons
10/3/2019 12:35:23	jcorney@utah.gov		BA 1F3	Anchor Rod: Change anchor rod callout in elevations to "Anchor rod with epoxy" full note is correctly shown in Plan	Callout changed as recommended.	David Simmons
10/3/2019 12:35:34	jcorney@utah.gov		BA 1F3	Elevations showing Thrie beam: Right side guardrail bolts are missing the rectangular washers	Rectangular washers are shown as intended. Note 4 explains the rectangular washers are placed under the nut on the downstream end of the thrie-beam.	David
10/3/2019 12:35:46	jcorney@utah.gov		BA 1F3	Note 1: Delete. Reference to the standard specification is not typical. Renumber all notes and references to notes.	Implemented	Shawn
10/3/2019 12:36:02	jcorney@utah.gov		BA 1F3	Note 7: Rewrite "Use galvanized threaded anchor rods conforming to ASTM C 1554, Grade 55 and washers and nuts according to ASTM F 436 and A 563 respectively. Embed anchor rods at least 5 inches and bond with epoxy resin according to AASHTO M 235 Type IV." We don't want these rods hot dip galvanized after purchase and the strength requirements are included in the AASHTO type IV requirements.	Note updated as recommended.	David Simmons
10/3/2019 12:36:14	jcorney@utah.gov		BA 1F	Align Note 3 with the rest of the notes	Implemented	Shawn D.
10/3/2019 12:36:24	jcorney@utah.gov		BA 2A	Scuppers are referring to Note B	Corrected	Shawn D.
10/3/2019 12:36:33	jcorney@utah.gov		BA 2C	Scuppers are referring to Note B	Corrected	Shawn D.
10/3/2019 12:36:43	jcorney@utah.gov		BA 2D	Delete "Type 1" from the expansion joint callout. Reference to BA 1A1 engages the distinction between type 1 and type 2. Type 2 is required at bridges.	Implemented	Shawn D.
10/3/2019 12:36:51	jcorney@utah.gov		BA 3J	Scupper are refers to Note B	Corrected	Shawn D.
10/3/2019 12:37:05	jcorney@utah.gov		BA 3K5	Delete "Type 1" from the expansion joint callout. Reference to BA 1A1 engages the distinction between type 1 and type 2. Type 2 is required at bridges.	Implemented	Shawn D.
10/3/2019 12:37:17	jcorney@utah.gov		BA 3Q2	Delete "Type 1" from the expansion joint callout. Reference to BA 1A1 engages the distinction between type 1 and type 2. Type 2 is required at bridges.	Implemented	Shawn D.
10/4/2019 14:49:40	dfriant@utah.gov	Daryl Friant	BA Drawings	No Comments		

10/7/2019 9:11:16	erik@wadsbro.com	Erik Wolf	BA 1F1	The free-standing barrier detail for the new F-Shape is requiring a 5'-0" min free board distance. The current jersey style indicates a 2'-0" distance of free board. If the purpose of the new F-Shaped barrier is provide "improved impact performance" why has the deflection distance increased by such a large distance?	Barrier deflection requirement have increased due to MASH crash testing criteria and as shown within the crash test reports. Vehicle wheight and height have both increased in comparison to NCHRP-350 criteria of which the New Jersey barrier was based on.	Shawn D.
10/7/2019 17:13:19	dlahusen@avenueconsultants.com	ACEC	BA-1C	What is the purpose of the 1' of pavement behind cast-in-place barrier? If these are being pinned into PCCP it doesn't seem necessary. Constructability it is designers understanding that all that is needed is 1" behind to run the slip form on. This comes up a lot on projects because the cost of extending the pavement under the barrier with 1' behind adds a lot to the budget and we have gotten deviations on some project to only provide 1". HMA is tougher because you don't get as clean of an edge so 1" would be difficult to construct.	Designer notes shown on the Design Manual BA 1C states: Deflection area and 1 ft pavement section behind barrier not required for cast-in-place barrier. For Constant Slope Precast barrier the 1 ft is requried for stabilzation pin strenght.	Shawn D.
10/9/2019 0:19:45	raycook@utah.gov	Ray Cook	BA series drawings	BA series: Several sheets do not follow standard format for detail headings. Heading sizes are inconsistent. Title Inconsistencies: BA 1A2, BA 1A3, BA 1C, BA 1F2 Compare to other BA drawings	Those drawings have sub details where the majority do not.	Shawn D.
10/9/2019 0:23:27	raycook@utah.gov	Ray Cook	BA 1A2	BA 1A2: Note 1: Connection Loop Detail references Note 1, but there is no information in Note 1 or anywhere else about materials for Connection Loops. 02844 will need to be updated since 02844, 2.2 states that connection pins, connection loops, and stabilization pins are all ASTM A 36. Note 1 creates a conflict. The specification will also need to distinguish between materials for F-shape and constant slope barriers since they are different. Note 2: Delete “bars.” It should read “connection loops.” Also add ASTM spec for galvanizing. Be aware that 02844, 2.2 does not address galvanizing of the pins and loops. Barrier Seal detail refers to Note 10 which does not exist.	Note 1: Modified to include material for connection loop. Spec Modified. Note 2: Corrected Note changed for Barrier Seal.	Shawn D.
10/9/2019 0:24:43	raycook@utah.gov	Ray Cook	BA 1A3	BA 1A3: Note 1 is incomplete. Add requirements for plates. Note 2: Delete “bars.” It should read “connection loops.” Also add ASTM spec for galvanizing. Be aware that 02844, 2.2 does not address galvanizing of the pins and loops. Note 7: Change “prior to” to “before.”	Note 1 modified. Note 2 modified. Note 7 modified	Shawn D.
10/9/2019 0:25:58	raycook@utah.gov	Ray Cook	BA 1C	BA 1C: Match headings to standard headings format. Note 3C: Change “Approval from Region Traffic Engineer” to “Engineer’s approval . . .” Retaining Barrier Note seems unnecessary since a permanent application will be shown in the plans. If the concern is for temporary work zone applications, it belongs in Note 3. Retained soil height table: Correct jersey shape to F-shape.	Drawing modified.	Shawn D.

10/9/2019 0:29:35	raycook@utah.gov	Ray Cook	BA 1D	BA 1D: Typical Elevation, Note 5: Where are the details for extra pins on asphalt for single slope barrier; BA 1F2 only applies to F-shape barrier. If extra pins are not required for single slope barrier on asphalt, modify the Typical Elevation notes to reflect that. Notes: Delete “General” from Notes heading. Though this has been brought up before, I still believe that at least Notes 1 and 3 are directed to designers and not to contractors. For example, end treatments are shown in the plans and have pay items associated with them. So why do we tell the Contractor to select appropriate end treatments? Details in the standard drawings should support what is shown in the plans. If it is intended that these notes apply to work zone applications where the contractor designs barrier applications, state that in the notes.	See line 55. Notes: General deleted. Barrier layout and positive protection requirements are the same for both temporary and perminant applications. Note 1 has been modified to include work zones. Note 1 has been heavily used by constuction personel to avoid improper tempoary barrier installations and to ensure proper installation of perminant applications. Note 2 has been used historically when plan set has missing w-beam element information and also for temporary applications. Note 3 has been used historically to ensure barrier is placed the correct distance from curb. Note 4 is for	Shawn D.
10/9/2019 0:31:07	raycook@utah.gov	Ray Cook	BA 1E	BA 1E: Having this sheet in two agenda items is redundant and can create confusion. Delete it from one of the agenda items. Top Elevation: Delete reference to Notes C & D since they were deleted. Also, both Elevations refer to a “Calculated Length of Need.” Is that the correct term? Where in the plans do we show that value measured from the edge of bridge deck; or should it be from the column)? Both Elevations: Adjust detail so that barrier footing is not above column footing. Sections: It is redundant to show the dimension range in the detail and below the title. In the Section for D>10’-0”, I think what you want to say is “10’-0” < D < Clear Zone,” although you could just say D > 10’-0” since outside the clear zone barrier is not required. I also think that it would be better to show one section and provide a table for the particulars of each case, including Notes 3 and 4. At times, it is difficult to pick up on the differences (which are few). (For example, the barrier in the right section is 42” and barrier in center section is 54” but they are shown the same height.) Notes 3 & 4 and their referencing are confusing. Obtaining “D” dimension from plans should apply to all sections. “Department approval” should be “Engineer’s approval.”	For further review, drawing will be pulled from this meeting.	Shawn D.
10/9/2019 0:32:47	raycook@utah.gov	Ray Cook	BA 1F1	BA 1F1: Median Barrier Pinned detail: Suggest to reword dimensioning to say “If Less Than 12”” above the line and “Stabilization Pins Required” below the line. Shouldn’t this apply to both sides of barrier? Notes: Revise Note 3C to require Engineer’s approval. Note 4 is a design-only note asking the Contractor to calculate length of need. This is part of the design and should be shown in plans.	Implemented	Shawn D.
10/9/2019 0:33:45	raycook@utah.gov	Ray Cook	BA 1F2	BA 1F2: Reword Note 1 to read: “Install transition after site preparation is complete” since site preparation is not part of barrier installation work. I suggest that Note 4 should be Note 1.	Implemented	Shawn D.
10/9/2019 0:36:07	raycook@utah.gov	Ray Cook	BA 1F3	BA 1F3: Note 2: “or” should be “of.” Note 6: ASTM A325 has been discontinued. It should be ASTM F 3125, Grade A325 bolts. Note 7: “a minimum 5 inches” with “at least 5 inch.” Note 9: I searched for these references and couldn’t find them. Do they contain additional information that is not shown on drawing and is necessary to select the correct bolt, nut, washer? If yes, perhaps a better reference is warranted. Also, replace “per” with “according to”.	Implemented	Shawn D.

10/9/2019 0:36:53	raycook@utah.gov	Ray Cook	BA 1F4	BA 1F4: Notes 4, 5: I searched for these references and couldn't find them. Do they contain additional information that is not shown on drawing and is necessary to select the correct product? If yes, perhaps a better reference is warranted. Also, replace "per" with "according to".	Implemented	Shawn D.
10/9/2019 0:38:46	raycook@utah.gov	Ray Cook	BA 2A, BA 2B	BA 2A, 2B: Elevation refers to Note B in two places. There is no Note B. (BA 2A only) Sections A-A and B-B are not different sections, one shows dimensions and the other shows reinforcing steel. I suggest to revise the section cuts and titles. (Section A-A with subtitle "Dimensions" and Section A-A with subtitle "Reinforcing". Show clearances to reinforcing steel. Is there a required clearance between V2 bars and stabilization pin slots? If yes, show it. Note 3 is redundant with Note 2. Note 5: Reword: "Provide scuppers when shown." 2nd sentence is not necessary since barrier seal is not shown on this sheet and it is covered on the sheet where it is shown. Note 6, 2nd sentence (construct radius) duplicates what is shown in the detail and can be deleted. BA 2B, Note 8: Replace "prior to" with "before."	- TTI documentation did not specify a clearance between V2 bars and slot. Therefore, none shown on detail. - Note 3: notes 2 and 3 are intended to direct attention to specific details on BA1A2. Suggest keeping notes as is. - Note 3, Note 5, Note 6, Note 8: Addressed as recommended.	David Simmons
10/9/2019 0:39:55	raycook@utah.gov	Ray Cook	BA 2C	BA 2C: Note 4 is redundant. Note 6: Reword: "Provide scuppers when shown." 2nd sentence is not necessary since barrier seal is not shown on this sheet and it is covered on the sheet where it is shown. Note 7: Redundant with Note 3. Note 8, 2nd sentence (construct radius) duplicates what is shown in the detail and can be deleted.	-Note 4: note 4 is intended to direct attention ot specific details on BA1A2 - Note 6: Addressed as recommended. - Note 7: Removed note 7 and added "Connection Pin" to note 3. - Note 8: addressed as recommended.	David Simmons
10/9/2019 0:40:47	raycook@utah.gov	Ray Cook	BA 2E	BA 2E: See BA 2C comments for notes and sections.	Addressed Section A-A cut location, subtitle of Section AA and Section B-B, and removed "Construct10 inch radius…" from note 3	David Simmons
10/9/2019 0:41:44	raycook@utah.gov	Ray Cook	BA 3J	BA 3J: Note 5: Reword: "Provide scuppers when shown." 2nd sentence is not necessary since barrier seal is not shown on this sheet and it is covered on the sheet where it is shown. Note 8, 2nd sentence (construct radius) duplicates what is shown in the detail and can be deleted. Note 9: Redundant with Note 3.	-Note 5: Addressed as recommended Note 8: Addressed as recommended Note 9: note 9 refers back to a specific detail on BA1A2, suggest keeping as is.	David Simmons
10/9/2019 0:42:45	raycook@utah.gov	Ray Cook	BA 3K5, BA 3Q2	BA 3K5, 3Q2: Delete Note 6	Addressed as recommended.	David Simmons
	fdoehring@utah.gov	Fred Doehring	BA 1A2	The hole in the plate is 1/8" larger than the pin. I dont know if that is enough to get the 85 deg angle but it certainly wont allow 60 deg. Will need to modify hole for 60 deg.	New plate washer details have been created for the 85 deg angle and the 60 deg angle.	David Simmons
	fdoehring@utah.gov	Fred Doehring	BA 1D	Buried End Section Plan: Where is the flare rate defined?	Not added referencing the plan set.	Shawn D.

	fdoehring@utah.gov	Fred Doehring	BA 1F4	Transition cap designed for only the 42" constant slope barrier? Are the Ribs Welded? Need Weld Types and galvanizing requirement. What are note 4 & 5 refering to?	The cap is designed for the 42" constant slope to F-shape barrier only as shown on BA 1F2. Call out added for clarification on. Welding information added to drawing. Note 2 modified to cover the tab requirements. Notes modified clearifing the Task Force 13 Report drawing number requirement.	Shawn and David



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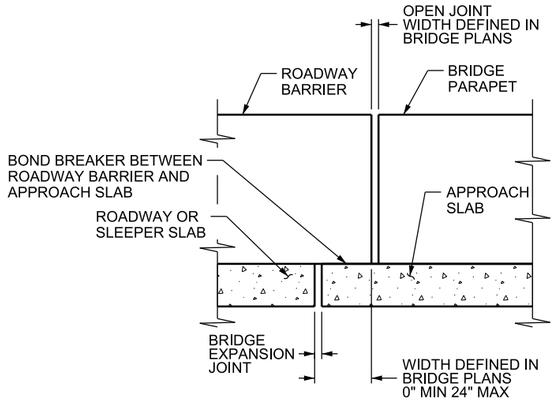
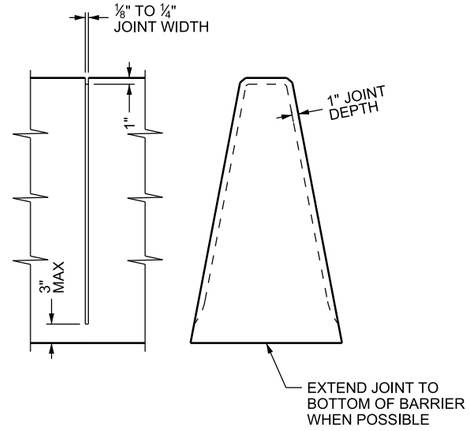


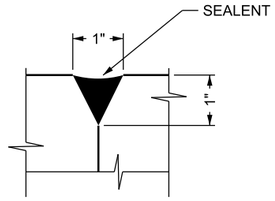
TYPE 2

EXPANSION JOINT DETAILS

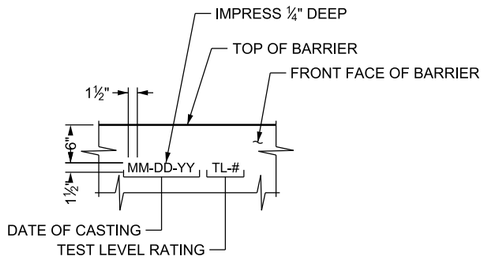


ELEVATION **END VIEW**

SAW CUT CONTRACTION JOINT

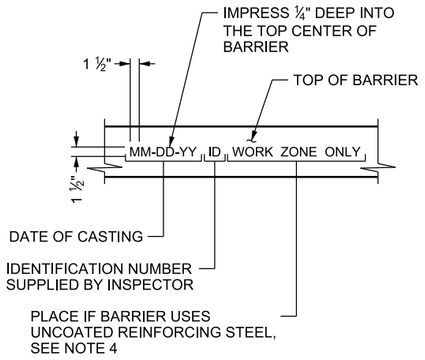


FORMED CONTRACTION JOINT



CAST-IN-PLACE BARRIER MARKING DETAIL

PLACE AT BEGINNING, END, AND AT 1,000-FT INTERVALS



PRECAST BARRIER MARKING DETAIL

LEGEND

A.S. = AS SHOWN
CIP = CAST-IN-PLACE
DIA = DIAMETER
EQ = EQUAL
R = RADIUS
SPA = SPACES

GENERAL NOTES:

1. PAVEMENT OVERLAY LIMITATIONS - EFFECTIVE BARRIER IS MEASURED FROM TOP OF PAVEMENT TO TOP OF BARRIER. DO NOT PLACE PAVEMENT OVERLAY THAT REDUCES EFFECTIVE BARRIER TO LESS THAN THE EFFECTIVE BARRIER LIMIT:
   A. 32 INCH F-SHAPE BARRIER: DO NOT OVERLAY MATERIAL PAST THE FIRST BREAK POINT OF BARRIER. FIRST BREAK POINT IS 3 INCHES ABOVE BOTTOM OF BARRIER. EFFECTIVE BARRIER LIMIT IS 29 INCHES.
   B. 42 INCH CONSTANT SLOPE BARRIER: EFFECTIVE BARRIER LIMIT IS 36 INCHES
   C. 54 INCH CONSTANT SLOPE BARRIER: EFFECTIVE BARRIER LIMIT IS 48 INCHES.
2. USE CLASS AA(AE) CONCRETE.
3. USE COATED DEFORMED CARBON STEEL REINFORCEMENT BARS CONFORMING TO AASHTO M 284 OR M 111 AND AASHTO M 31 GRADE 60, RESPECTIVELY.
4. USE OF NON-COATED REINFORCING STEEL SCHEDULE ALLOWED FOR BARRIER SECTIONS CONSTRUCTED FOR USE IN WORK ZONE APPLICATIONS. MARK AS "WORK ZONE ONLY." SEE "PRECAST BARRIER MARKING DETAIL." DO NOT USE BARRIER MARKED AS "WORK ZONE ONLY" IN PERMANENT APPLICATIONS.
5. CONSTRUCT BARRIER BY FIXED FORM OR SLIP FORM METHOD.
6. PLACE A VERTICAL CONSTRUCTION JOINT AT END OF DAY'S POUR AND WHEN WORK IS HALTED FOR MORE THAN 2 HOURS.
7. PROVIDE END SECTION AT BARRIER ENDS AND AT INTERRUPTIONS IN THE BARRIER INCLUDING EXPANSION JOINTS AND CRASH CUSHIONS.
8. SEE STD DWG GW 6B FOR DELINEATION HARDWARE AND STD DWG GW 7A FOR DELINEATION SPACING.
9. PROVIDE 1.5 INCH MINIMUM COVER TO REINFORCING STEEL UNLESS NOTED OTHERWISE. REINFORCING STEEL DIMENSIONS ARE OUT TO OUT AND INSIDE BEND RADII ARE SHOWN. BEND STIRRUPS OUT OF PLANE IF NECESSARY TO MEET MINIMUM CLEARANCE.
10. LOCATE EXPANSION JOINTS IN CONCRETE BARRIER AT ALL TRANSITIONS AND APPROACH SLABS. USE A TYPE 1 EXPANSION JOINT AT TRANSITIONS. USE A TYPE 2 EXPANSION JOINT AT APPROACH SLABS.
11. INSTALL ELECTRICAL/ATMS CONDUITS, JUNCTION BOXES, AND PULL BOXES AS REQUIRED PER CONTRACT DOCUMENTS.
12. SAW OR CUT CONTRACTION JOINTS 1 INCH DEEP AT PAVEMENT TRANSVERSE JOINTS OR AT 15 FT MAX SPACING WHEN PLACED ON ASPHALT PAVEMENT. SAW OR CUT WITHIN 10 HOURS OF CONCRETE PLACEMENT. USE FORM CONTRACTION JOINT DETAIL IF PLACING BARRIER BY FORM METHOD.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MOVED DESIGN ONLY NOTES TO RDM SHEETS.
2	10/31/19	SDD	MODIFIED NOTE 1A.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — OCT. 31, 2019 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — OCT. 31, 2019 DATE

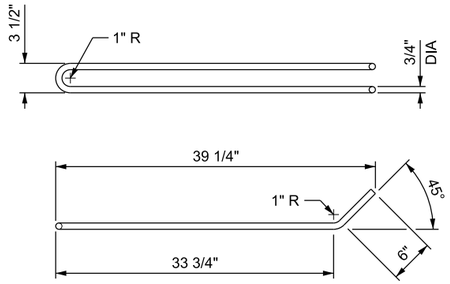
DEPUTY DIRECTOR

CONCRETE BARRIER
GENERAL NOTES AND
STANDARD DETAILS
1 OF 3

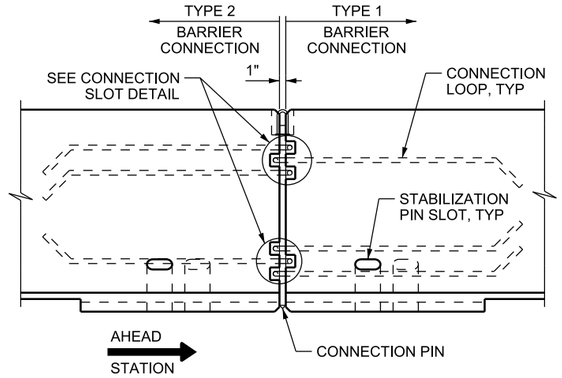
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 1A1

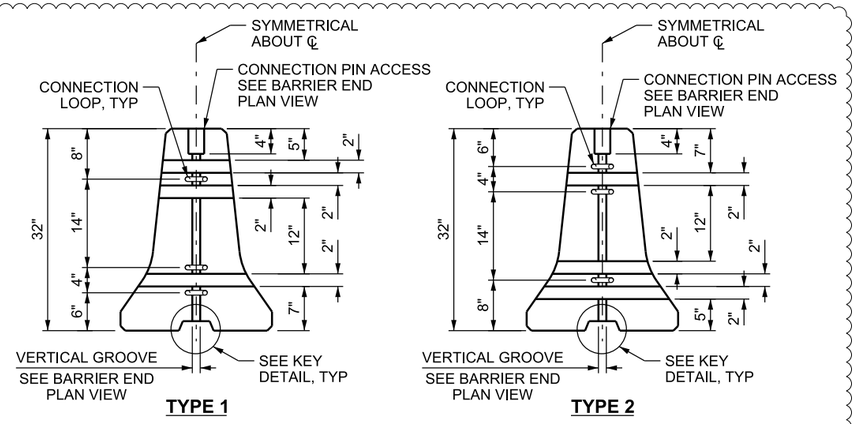
DGN File: G:\StandardsandSpecsSection\Standards Committee\MeetingFiles\2019\6-October 31, 2019\Incoming\SAF - Shawn\3-AgendaVersion\B4 F Shape Barrier\BA01A1.dgn
16-OCT-2019



CONNECTION LOOP

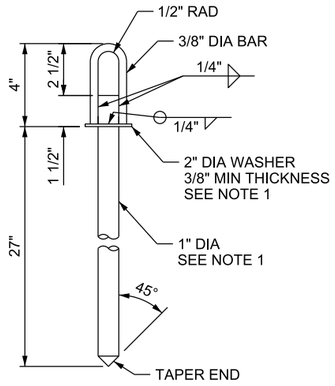


CONNECTION DETAIL

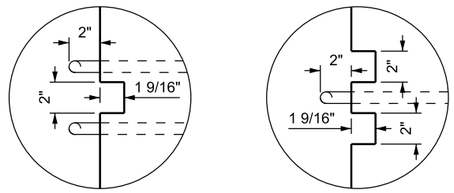


TYPICAL BARRIER CONNECTION

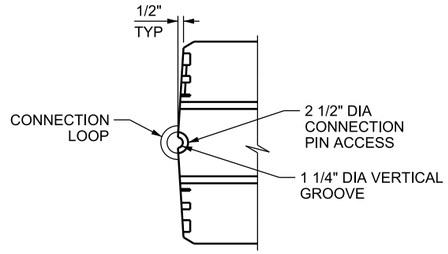
FULL BARRIER SHOWN, HALF BARRIER SIMILAR



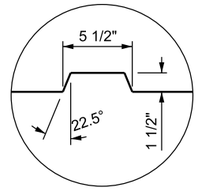
CONNECTION PIN



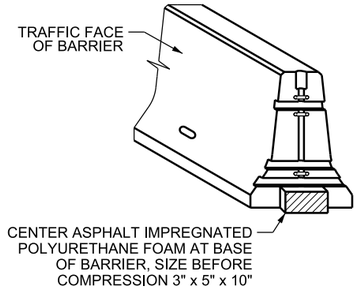
CONNECTION SLOT DETAIL



BARRIER END PLAN VIEW



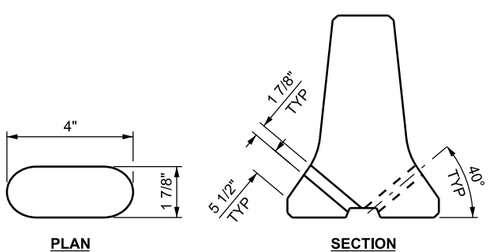
KEY DETAIL



BARRIER SEAL

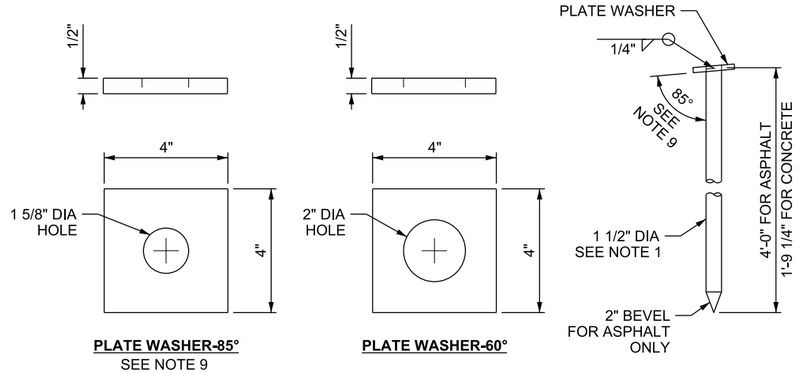
SEE NOTE 7

F-SHAPE BARRIER CONNECTION DETAILS



STABILIZATION PIN SLOT

SEE NOTE 8



STABILIZATION PIN

SEE NOTE 1

F-SHAPE BARRIER STABILIZATION PIN DETAILS

NOTES:

1. USE STEEL MEETING ASTM A 36 FOR CONNECTION LOOP, STABILIZATION PIN AND ASSOCIATED PLATE WASHER. USE STEEL MEETING ASTM A 449, TYPE 1, FOR THE CONNECTION PIN AND ASTM A 572, GRADE 50, FOR THE ASSOCIATED PLATE WASHER.
2. HOT DIP GALVANIZE CONNECTION LOOP, CONNECTION PINS, AND STABILIZATION PINS AFTER MANUFACTURING ACCORDING TO ASTM A153.
3. DO NOT HEAT TO MAKE BENDS.
4. USE OF A HOT-FORGED HEAD, MEETING PLATE SIZE AND THICKNESS IS ACCEPTABLE IN PLACE OF A WELDED PLATE.
5. PULL BARRIER TIGHT AFTER INSTALLING THE CONNECTION PIN THEN INSTALL STABILIZATION PINS IF REQUIRED. ANGLE BARRIERS A MAXIMUM OF 7 DEGREES AT CONNECTIONS.
6. SEE APPLICABLE CONCRETE BARRIER DRAWINGS FOR REINFORCING STEEL REQUIREMENTS.
7. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT.
8. PRE-DRILL A 1 3/4 INCH DIA HOLE THROUGH PAVEMENT AND ENTIRE DEPTH WHEN SOIL CONDITIONS REQUIRE IT USING STABILIZATION PIN SLOTS AS A GUIDE.
9. USE 60 DEGREE ANGLE FOR STABILIZATION PINS USED IN CONSTANT SLOPE BARRIER LIMITS OF PRECAST TRANSITION BARRIER.

SUPPLEMENTAL DRAWING

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	ENTIRE DRAWING REVISED.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — OCT. 31, 2019 DATE

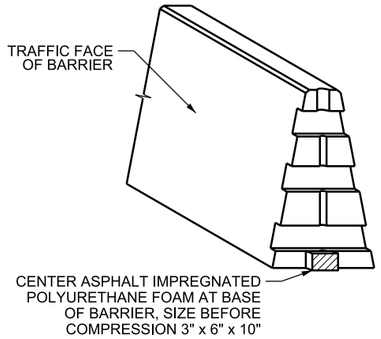
CHAIRMAN STANDARDS COMMITTEE APPROVED — OCT. 31, 2019 DATE

DEPUTY DIRECTOR

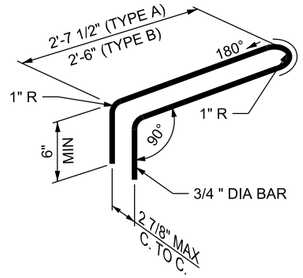
CONCRETE BARRIER
GENERAL NOTES AND
STANDARD DETAILS
2 OF 3

STANDARD DRAWING TITLE

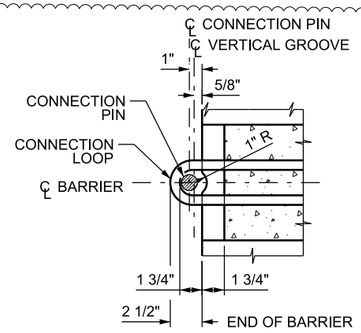
STD. DWG. NO.
BA 1A2



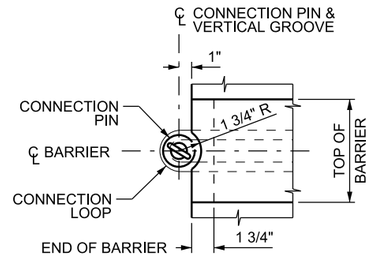
BARRIER SEAL



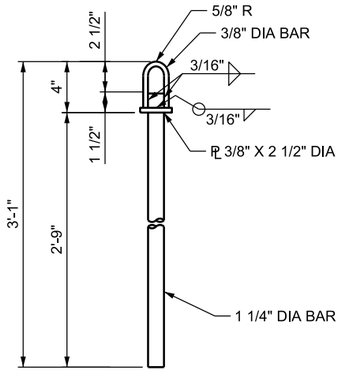
CONNECTION LOOP



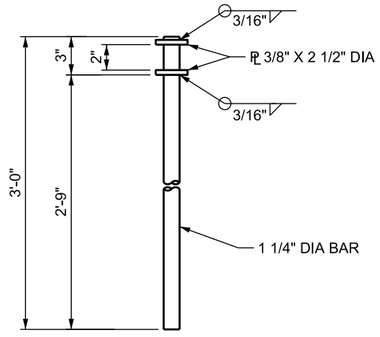
CONNECTION LOOP PLACEMENT



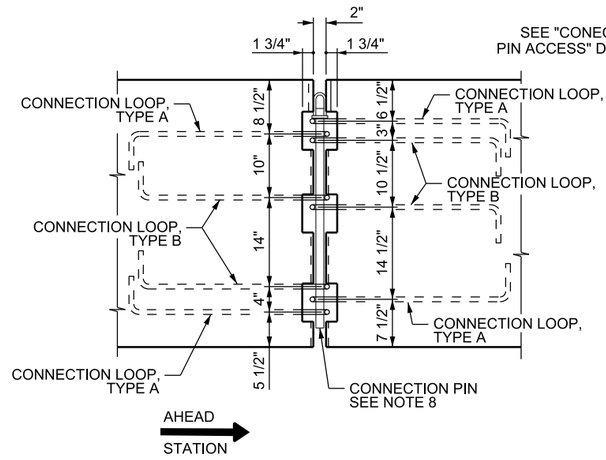
CONNECTION PIN ACCESS



CONNECTION PIN OPTION 1

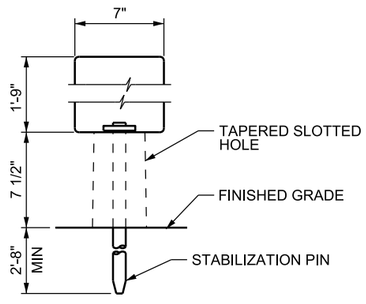


CONNECTION PIN OPTION 2

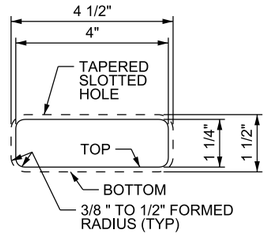


TYPICAL BARRIER CONNECTION

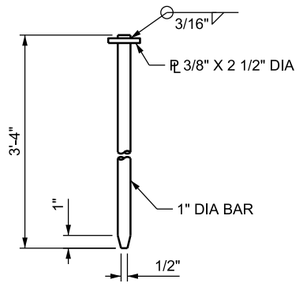
CONSTANT SLOPE BARRIER CONNECTION DETAILS



BLOCK OUT ELEVATION



BLOCK OUT PLAN



CONSTANT SLOPE STABILIZATION PIN

BARRIER BLOCK OUT AND STABILIZATION PIN DETAILS

NOTES:

1. USE STEEL ROD MEETING ASTM A 36 FOR CONNECTION LOOP, STABILIZATION PIN AND ASSOCIATED PLATE WASHER.
2. HOT DIP GALVANIZE CONNECTION LOOP, CONNECTION PINS, AND STABILIZATION PINS AFTER MANUFACTURING ACCORDING TO ATSM A153.
3. DO NOT HEAT TO MAKE BENDS.
4. USE OF A HOT-FORGED HEAD, MEETING PLATE SIZE AND THICKNESS IS ACCEPTABLE IN PLACE OF A WELDED PLATE.
5. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT.
6. CENTER STABILIZATION PIN IN TAPERED SLOTTED HOLE.
7. PRE-DRILL A 1 INCH DIA HOLE THROUGH PAVEMENT AND ENTIRE DEPTH WHEN SOIL CONDITIONS REQUIRE IT BEFORE INSTALLING STABILIZATION PIN.
8. PULL BARRIER TIGHT AFTER INSTALLING THE CONNECTION PIN THEN INSTALL STABILIZATION PINS IF REQUIRED.
9. SEE APPLICABLE CONCRETE BARRIER DRAWINGS FOR REINFORCING STEEL REQUIREMENTS.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — OCT. 31, 2019 — DATE

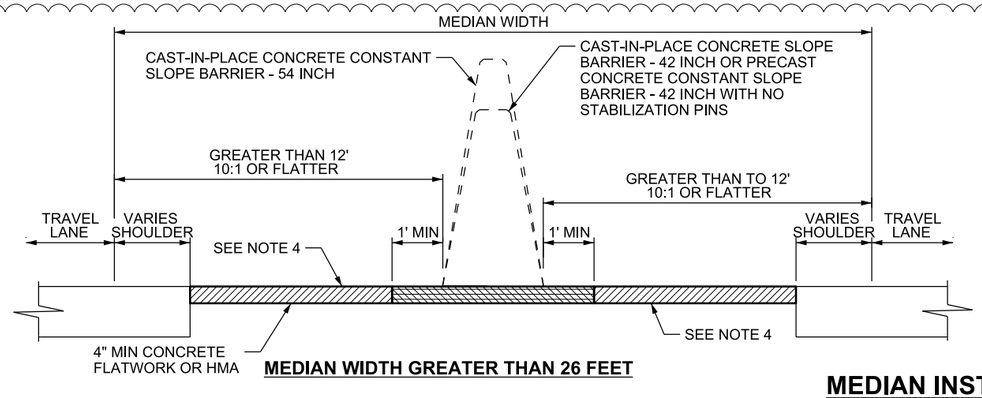
CHAIRMAN STANDARDS COMMITTEE APPROVED — OCT. 31, 2019 — DATE

DEPUTY DIRECTOR

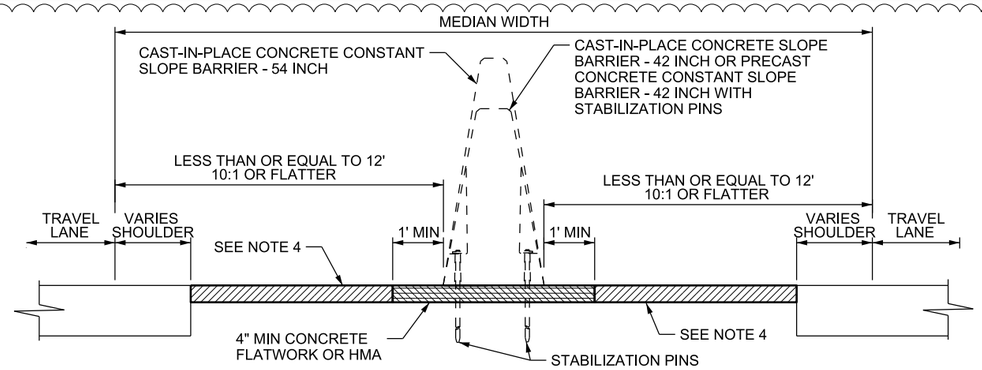
CONCRETE BARRIER
GENERAL NOTES AND
STANDARD DETAILS
3 OF 3

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 1A3

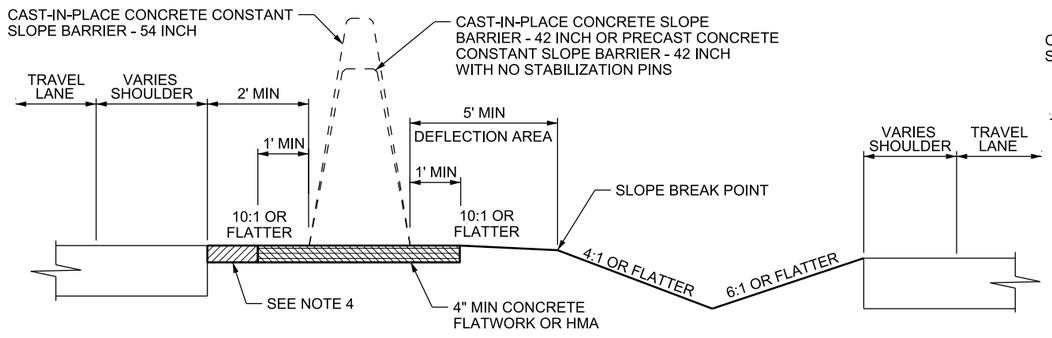


MEDIAN WIDTH GREATER THAN 26 FEET

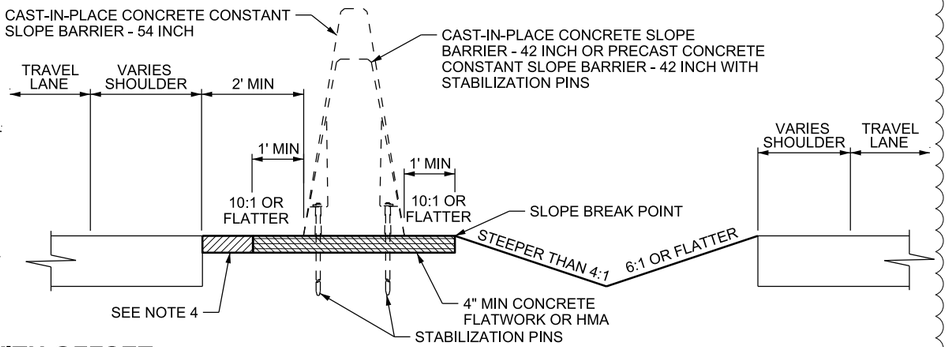


MEDIAN WIDTH LESS THAN OR EQUAL TO 26 FEET

MEDIAN INSTALLATION

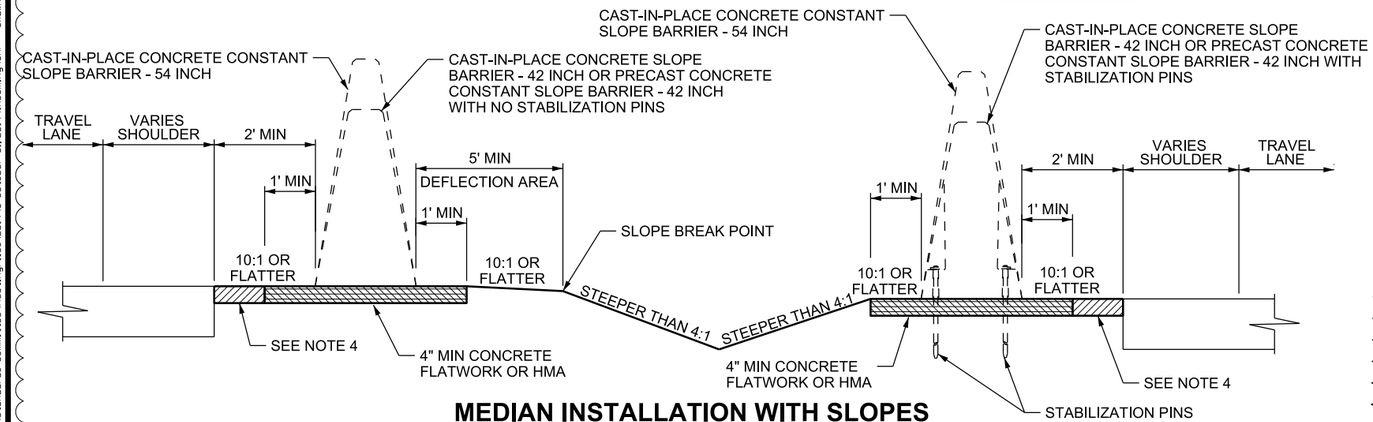


PLACEMENT WITH DEFLECTION AREA

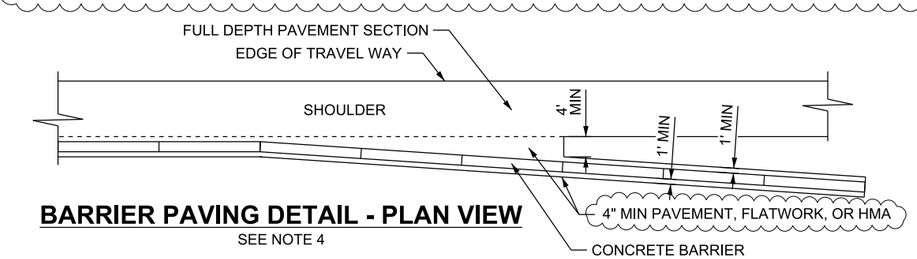


PLACEMENT WITHOUT DEFLECTION AREA

MEDIAN INSTALLATION WITH OFFSET ROADWAY



MEDIAN INSTALLATION WITH SLOPES STEEPER THAN 4:1



BARRIER PAVING DETAIL - PLAN VIEW

SEE NOTE 4

NOTES:

1. PIN ALL PRECAST BARRIER SECTIONS TOGETHER AT CONNECTION LOOPS. PULL BARRIER TIGHT AFTER INSTALLING CONNECTION PIN.
2. P1 BARS IN CAST-IN-PLACE CONCRETE BARRIER ARE REQUIRED IN ALL APPLICATIONS. SEE CAST-IN-PLACE CONCRETE BARRIER DRAWINGS FOR REINFORCING STEEL REQUIREMENTS.
3. TEMPORARY WORK ZONE APPLICATIONS:
   - 3A. STABILIZATION PINS ARE NOT REQUIRED WHEN 1 FT OR MORE IS PROVIDED BEYOND THE BARRIER.
   - 3B. STABILIZATION PINS ARE REQUIRED WHEN SLOPE BEHIND THE 1 FT DISTANCE BEYOND THE BARRIER IS STEEPER THAN 2:1.
   - 3C. APPROVAL FROM THE REGION TRAFFIC ENGINEER IS REQUIRED TO USE STABILIZATION PINS IN LIEU OF THE 1 FT DISTANCE BEHIND THE BARRIER.
   - 3D. DO NOT PLACE STABILIZATION PINS IN NEW ROADWAY SURFACE FOR TEMPORARY BARRIER.
   - 3E. INSTALL APPROVED CRASH CUSHION OR END TREATMENT ON APPROACH ENDS. SEE GUIDELINES FOR CRASH CUSHION AND END TREATMENTS, CURRENT EDITION, WORK ZONE DEVICES.
4. PAVE AREAS LESS THAN 4 FT WIDE (BARRIER FACE TO EDGE OF PAVED SHOULDER) WITH 4 INCH MIN THICK PAVEMENT, FLATWORK OR HMA. COMPACTED SHOULDER MATERIAL IS ALLOWED WHERE THE DISTANCE IS GREATER THAN 4 FT.
5. SEE STD. DWG. BA 1F SERIES FOR CONCRETE BARRIER F-SHAPE INSTALLATION OPTIONS.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
2	10/31/19	SDD	REMOVED JERSEY PRECAST BARRIER OPTION, MODIFIED DEFLECTION AREA FOR PRECAST CONSTANT SLOPE BARRIER.
1	6/27/19	CGW	ADDED NOTE 4 AND PAVING DETAIL FOR MATERIAL BETWEEN SHOULDER AND BARRIER

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

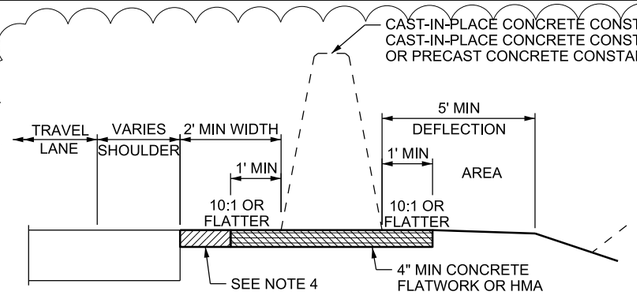
RECOMMENDED FOR APPROVAL	OCT. 31, 2019 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	OCT. 31, 2019 DATE
DEPUTY DIRECTOR	DATE

CONCRETE BARRIER
MEDIAN INSTALLATION

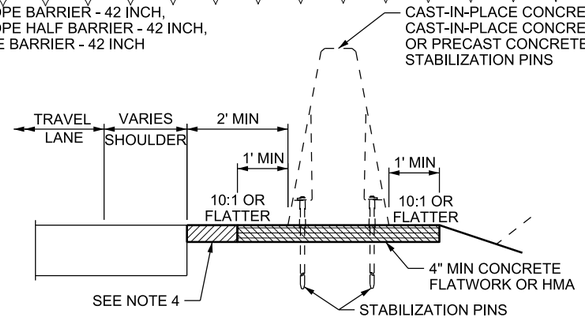
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 1B

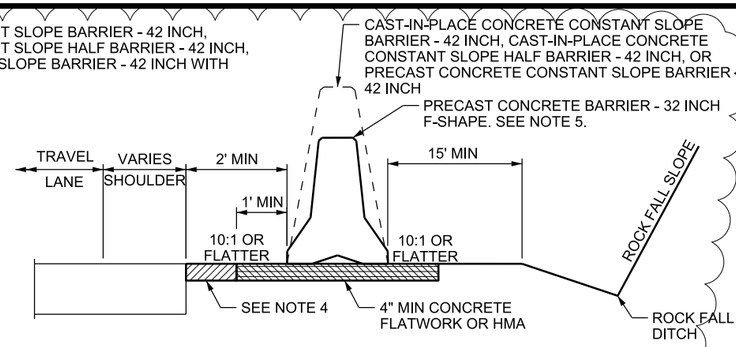
DGN File: D:\Standards\Specs\Section\Standards Committee\MeetingFiles\2019\6-October 31, 2019\Incoming\SAF - Shawn\3-AgendaVersion\BA F Shape Barrier\BA01B 10 15.dgn
16-OCT-2019



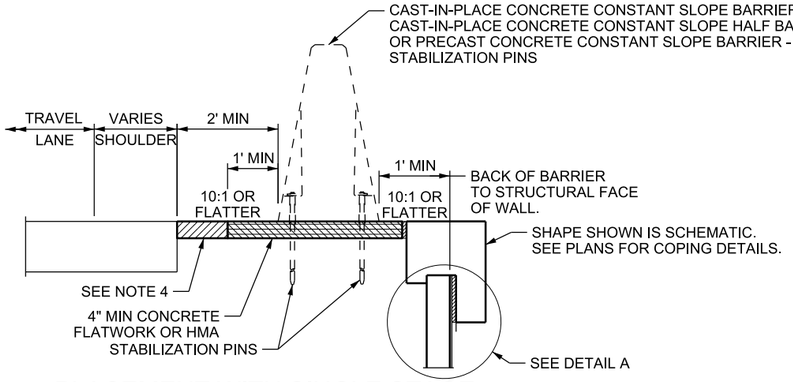
PLACEMENT WITH DEFLECTION AREA



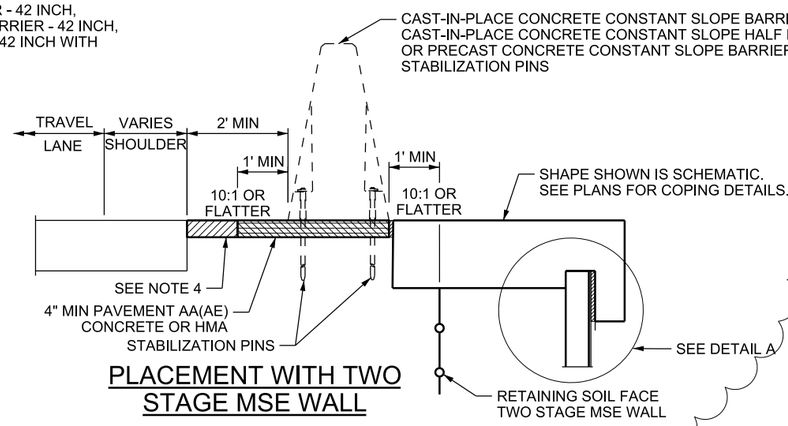
PLACEMENT WITHOUT DEFLECTION AREA



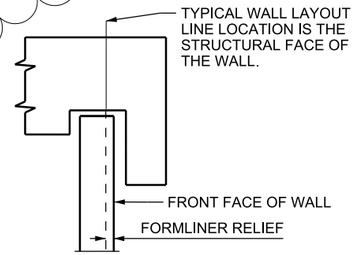
PLACEMENT WITH ROCK FALL CONSIDERATIONS



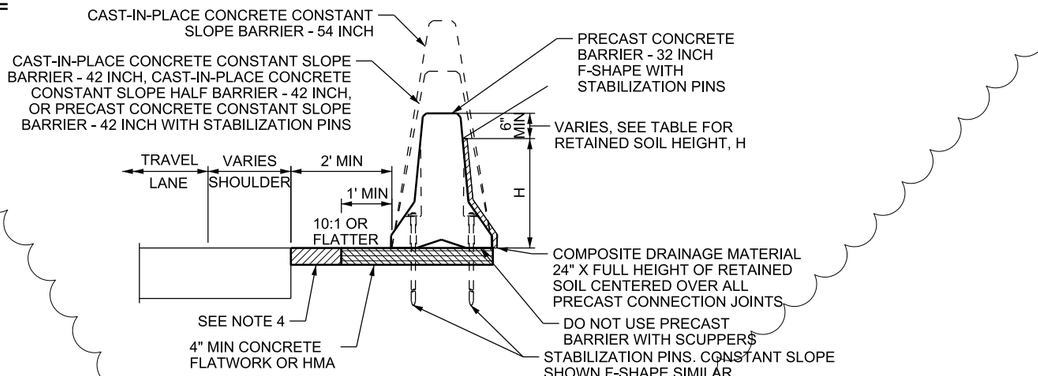
PLACEMENT WITH SINGLE STAGE MSE OR RETAINING WALL



PLACEMENT WITH TWO STAGE MSE WALL



DETAIL A

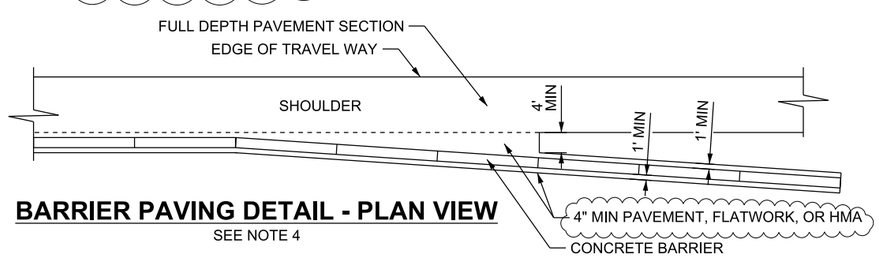


RETAINING BARRIER

ENGINEER'S APPROVAL REQUIRED WITH VERIFICATION BY THE REGION PRECONSTRUCTION ENGINEER

PERMISSIBLE RETAINED SOIL HEIGHT (H)		
BARRIER TYPE	BACKSLOPE	
	2:1 OR FLATTER	LEVEL WITH LL SURCHARGE *
PRECAST CONCRETE BARRIER - 32 INCH F-SHAPE	26"	13"
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH OR PRECAST CONCRETE CONSTANT SLOPE BARRIER - 42 INCH	35"	19"
CAST-IN-PLACE CONCRETE CONSTANT SLOPE HALF BARRIER - 42 INCH	29"	15"

*ACCOUNTS FOR 2 FT OF EQUIVALENT SOIL FOR LIVE LOAD SURCHARGE.



BARRIER PAVING DETAIL - PLAN VIEW

SEE NOTE 4

NOTES

1. PIN ALL PRECAST BARRIER SECTIONS TOGETHER AT CONNECTION LOOPS. PULL BARRIER TIGHT AFTER INSTALLING CONNECTION PIN.
2. P1 BARS IN CAST-IN-PLACE CONCRETE BARRIER ARE REQUIRED IN ALL APPLICATIONS. SEE APPLICABLE CAST-IN-PLACE CONCRETE BARRIER DRAWINGS FOR REINFORCING STEEL REQUIREMENTS.
3. TEMPORARY WORK ZONE APPLICATIONS:
   - 3A. STABILIZATION PINS ARE NOT REQUIRED WHEN 1 FT OR MORE IS PROVIDED BEYOND THE BARRIER.
   - 3B. STABILIZATION PINS ARE REQUIRED WHEN SLOPE BEHIND THE 1 FT DISTANCE BEYOND THE BARRIER IS STEEPER THAN 2:1.
   - 3C. APPROVAL FROM THE THE ENGINEER IS REQUIRED TO USE STABILIZATION PINS IN LIEU OF THE 1 FT DISTANCE BEHIND THE BARRIER.
   - 3D. DO NOT PLACE STABILIZATION PINS IN NEW ROADWAY SURFACE FOR TEMPORARY BARRIER.
   - 3E. INSTALL APPROVED CRASH CUSHION OR END TREATMENT ON APPROACH ENDS. SEE GUIDELINES FOR CRASH CUSHION AND END TREATMENTS, CURRENT EDITION, WORK ZONE DEVICES.
4. PAVE AREAS LESS THAN 4 FT WIDE (BARRIER FACE TO EDGE OF PAVED SHOULDER) WITH 4 INCH MIN THICK PAVEMENT. COMPACTED SHOULDER MATERIAL IS ALLOWED WHERE THE DISTANCE IS GREATER THAN 4 FT.
5. SEE STD. DWG. BA 1F SERIES FOR CONCRETE BARRIER F-SHAPE INSTALLATION OPTIONS.

SUPPLEMENTAL DRAWING

REVISIONS				
NO.	DATE	APPR.	REMARKS	
2	10/31/19	SDD	REMOVED JERSEY PRECAST BARRIER OPTION, MODIFIED DEFLECTION AREA FOR PRECAST CONSTANT SLOPE BARRIER, ADDED 54 INCH RETAINING BARRIER OPTION.	
1	6/27/19	CGW	DELETED PLACEMENT WITH BARRIER OFFSET DETAIL. ADDED NOTE 4 AND PAVING DETAIL FOR MATERIAL BETWEEN SHOULDER AND BARRIER	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
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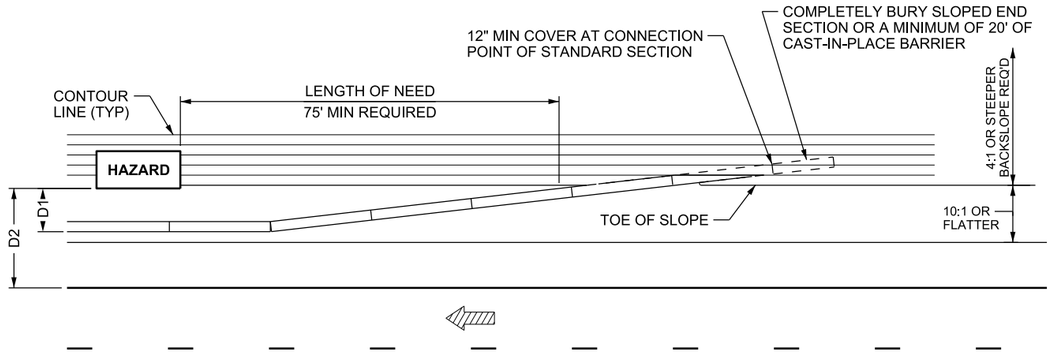
DEPUTY DIRECTOR

CONCRETE BARRIER SHOULDER INSTALLATION

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 1C

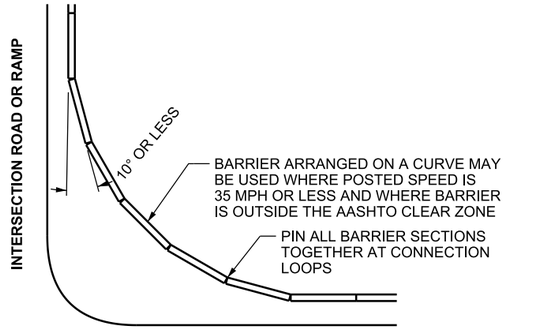


LENGTH OF NEED (LON) FORMULAS FOR BURIED END SECTION

BACKSLOPE STEEPER THAN 3:1
LON = FLR x D1

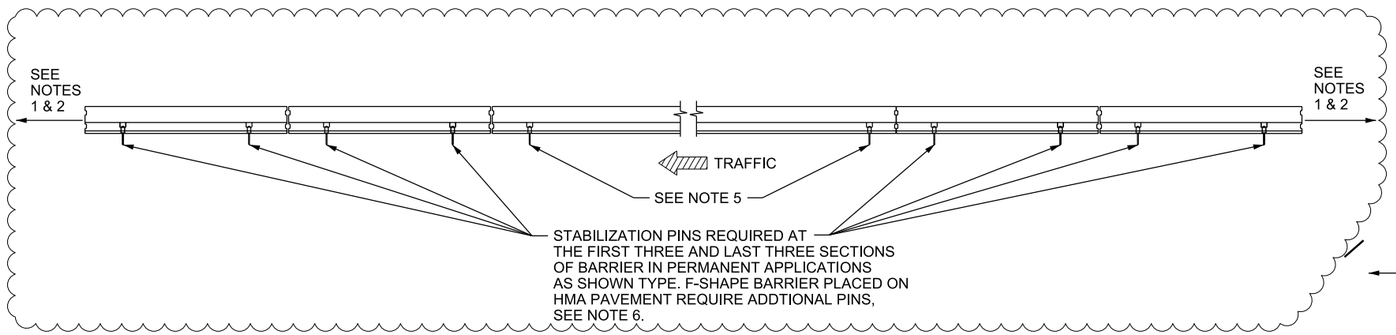
BACKSLOPE 3:1 TO A MINIMUM 4:
≥ 50 MPH "LON"= 450 - (15 x D2)
≤ 45 MPH "LON"= 250 - (15 x D2)

LON: LENGTH OF NEED
FLR: BARRIER FLARE RATE, SEE PROJECT PLANS.
D1: DISTANCE FROM FACE OF BARRIER TO FACE OF HAZARD OR DITCH BOTTOM
D2: DISTANCE FROM EDGE OF TRAVEL LANE TO FACE OF HAZARD OR DITCH BOTTOM



CROSS STREET OR OVERPASS
SEE BA 1E FOR COLUMN PROTECTION REQUIREMENTS

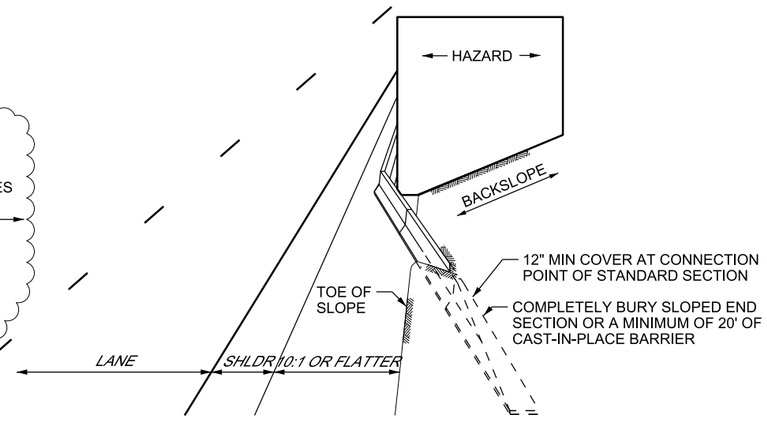
BURIED END SECTION PLAN



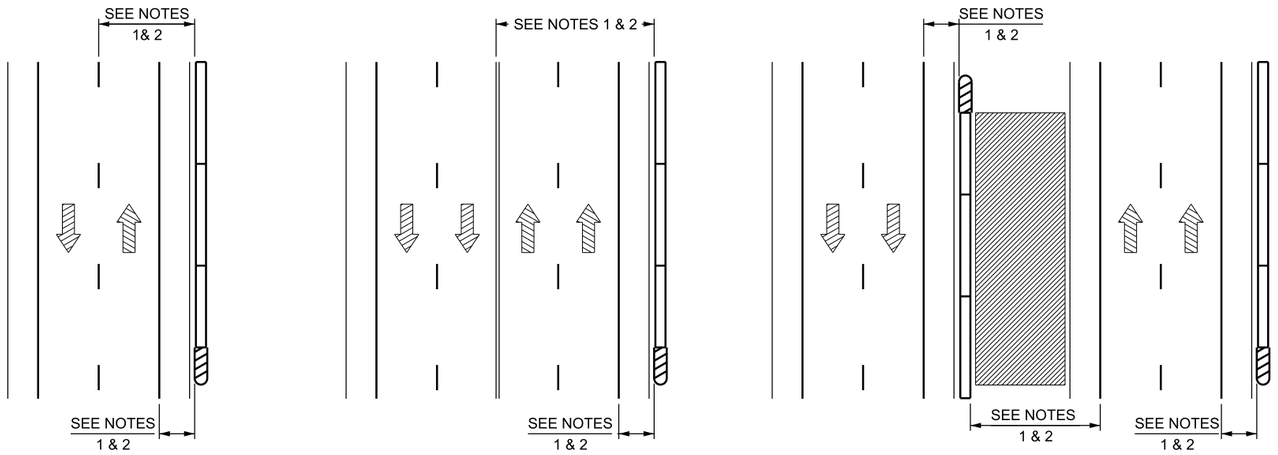
TYPICAL ELEVATION

F-SHAPE BARRIER SHOWN. PRECAST CONSTANT SLOPE SIMILAR.

CURVED LAYOUT



BURIED END SECTION PERSPECTIVE VIEW



TWO LANE / TWO WAY

MULTI-LANE ARTERIAL

MULTI-LANE ARTERIAL WITH TRAVERSABLE MEDIAN

NOTES:

1. INSTALL APPROPRIATE END TREATMENT, CRASH CUSHION, OR END SECTION WHEN BARRIER END IS WITHIN THE MAXIMUM REQUIRED AASHTO CLEAR ZONE. DO NOT EXTEND FLARED BARRIER IN ORDER TO MOVE END OF BARRIER OUTSIDE OF CLEAR ZONE TO AVOID USING END PROTECTION FOR BOTH WORK ZONE AND PERMANENT APPLICATIONS.
   A. SELECT APPROPRIATE END TREATMENT OR CRASH CUSHION FROM THE GUIDELINES FOR CRASH CUSHIONS AND BARRIER END TREATMENTS WHEN DESIGN SPEED EXCEEDS 40 MPH. USE AN END TREATMENT WHEN RECOVERY AREA BEHIND SELECTED SYSTEM IS ACHIEVED.
   B. APPROACH END NON-DIVIDED ROADWAYS: INSTALL A SLOPED END SECTION WHEN DESIGN SPEED FOR ROADWAY IS 40 MPH OR LESS. USE APPROPRIATE SECTION FOR BARRIER TYPE.
   C. TRAILING END NON-DIVIDED ROADWAYS: INSTALL A SLOPED END SECTION ON TRAILING ENDS WHEN AN END TREATMENT OR CRASH CUSHION IS NOT REQUIRED.
2. INSTALL APPLICABLE BARRIER TRANSITION PRIOR TO INSTALLING W-BEAM, END TREATMENT, OR CRASH CUSHION WHEN A CONSTANT SLOPE SYSTEM IS USED.
3. PLACEMENT WITH CURBS:
   A. 32 INCH BARRIER: 10-FT SET BACK REQUIRED FROM FACE OF CURB.
   B. 42 INCH AND 54 INCH BARRIER: 10-FT SET BACK RECOMMENDED FROM FACE OF CURB.
4. SLOPED END SECTION DOES NOT NEED TO BE PLACED ON A PAVED SURFACE WHEN USED IN A BURIED END SECTION APPLICATION.
5. INSTALL ONE STABILIZATION PIN IN THE SLOT OF THE LAST FREE-STANDING SEGMENT CLOSEST TO THE FIRST PINNED SEGMENT WHEN TRANSITION FROM FREE-STANDING TO PINNED BARRIER.
6. SEE STD. DWG. BA 1F2 FOR BARRIER LAYOUT REQUIREMENTS.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MOVED DESIGN ONLY NOTES TO RDM SHEETS.
2	10/31/19	SDD	MODIFIED TYPICAL ELEVATION. ADDED NOTES 5 & 6.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

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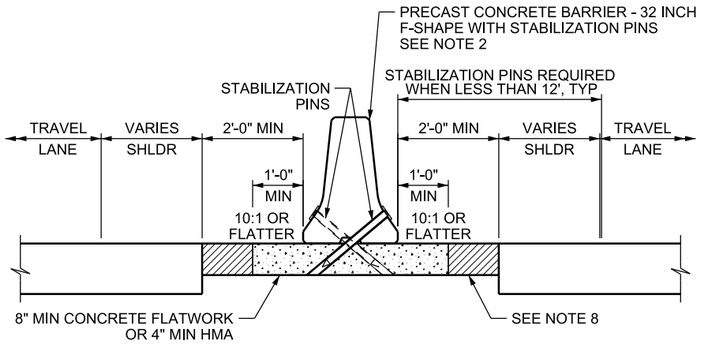
DEPUTY DIRECTOR

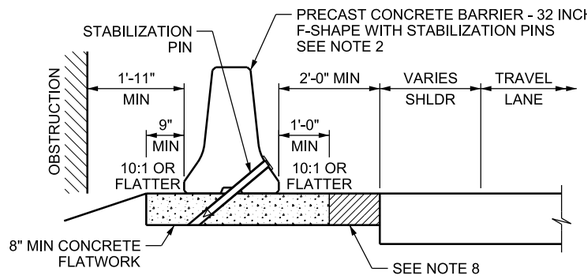
STANDARD DRAWING TITLE
CONCRETE BARRIER LAYOUT

STD. DWG. NO.
BA 1D



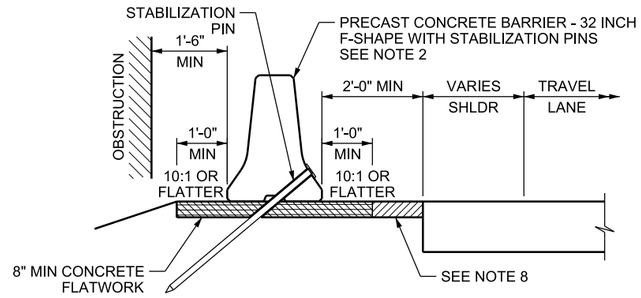
MEDIAN BARRIER PINNED

SEE NOTE 5



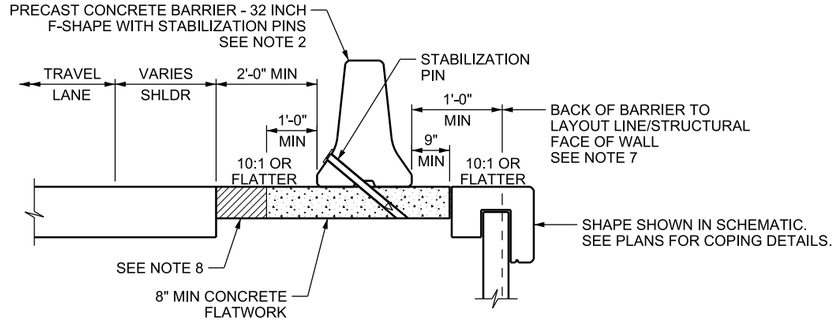
BARRIER PINNED TO CONCRETE PAVEMENT

SEE NOTE 5



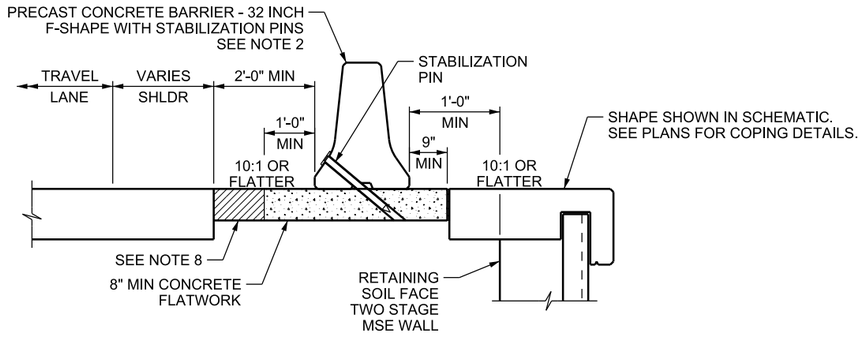
BARRIER PINNED TO ASPHALT PAVEMENT

SEE NOTE 5



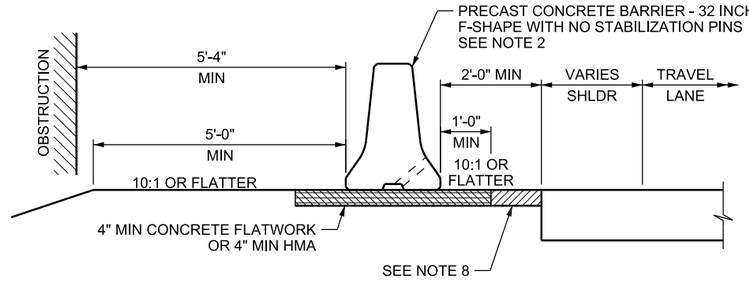
PLACEMENT WITH SINGLE STAGE MSE OR RETAINING WALL

SEE NOTE 5



PLACEMENT WITH TWO STAGE MSE WALL

SEE NOTE 5



FREE-STANDING BARRIER

SEE NOTE 6

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "PRECAST CONCRETE BARRIER - 32 INCH F-SHAPE" ON STD DWG BA 2A FOR BARRIER CROSS SECTION DIMENSIONS.
3. TEMPORARY WORK ZONE APPLICATIONS:
   - 3A. STABILIZATION PINS ARE NOT REQUIRED WHEN 1 FT OR MORE IS PROVIDED BEYOND THE BARRIER.
   - 3B. STABILIZATION PINS ARE REQUIRED WHEN SLOPE BEHIND THE 1 FT DISTANCE BEYOND THE BARRIER IS STEEPER THAN 2:1.
   - 3C. ENGINEER'S APPROVAL IS REQUIRED TO USE STABILIZATION PINS IN LIEU OF THE 1 FT DISTANCE BEHIND THE BARRIER.
   - 3D. DO NOT PLACE STABILIZATION PINS IN NEW ROADWAY SURFACE FOR TEMPORARY BARRIER.
   - 3E. INSTALL APPROVED CRASH CUSHION OR END TREATMENT ON APPROACH ENDS. SEE GUIDELINES FOR CRASH CUSHION AND END TREATMENTS, CURRENT EDITION, WORK ZONE DEVICES.
4. PROVIDE BARRIER SEGMENTS FOR AT LEAST THE CALCULATED LENGTH OF NEED UPSTREAM FROM HAZARDS AND PROVIDE AT LEAST THREE PRECAST CONCRETE BARRIER SEGMENTS DOWNSTREAM OF HAZARDS. DO NOT INSTALL FEWER THAN SIX BARRIER SEGMENTS.
5. USE THE FOLLOWING NUMBER OF STABILIZATION PINS IN EACH BARRIER SEGMENT AT PINNED PRECAST F-SHAPE CONCRETE BARRIERS:
   - 5A. FOR CONCRETE PAVEMENT - 2 PINS (SHOULDER) AND 4 PINS (MEDIAN)
   - 5B. FOR ASPHALT PAVEMENT - 3 PINS (SHOULDER) AND 6 PINS (MEDIAN)
6. SEE STD DWG BA 1F2 FOR STABILIZATION PIN PLACEMENT WHEN TERMINATING FREE-STANDING PRECAST F-SHAPE CONCRETE BARRIER OR TRANSITIONING FROM FREE-STANDING TO PINNED BARRIER OR RIGID BARRIER.
7. SEE "DETAIL A" ON STD DWG BA 1C FOR DETAILS.
8. SEE "BARRIER PAVING DETAIL - PLAN VIEW" ON STD DWG BA 1C FOR ADDITIONAL PAVING INFORMATION.
9. SEE STD DWG BA 1C FOR PRECAST CONCRETE BARRIER - 32 INCH F-SHAPE PLACEMENT IN ROCK FALL CONSIDERATION OR AS A RETAINED BARRIER.

SUPPLEMENTAL DRAWING

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	10/31/19	SDD	NEW DRAWING.	

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
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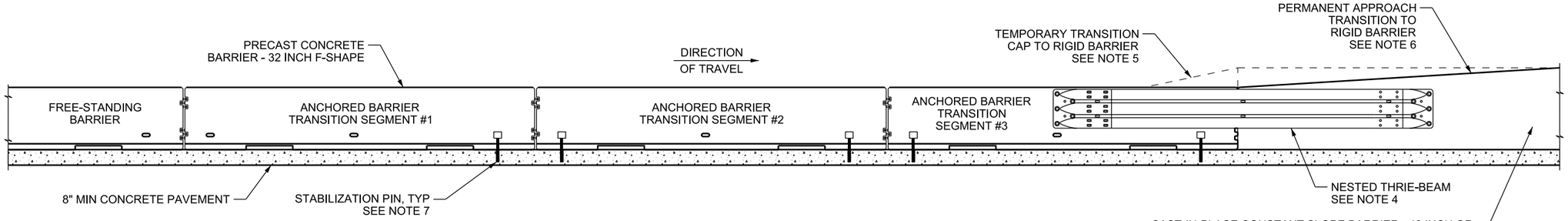
RECOMMENDED FOR APPROVAL	OCT. 31, 2019	DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	OCT. 31, 2019	DATE
DEPUTY DIRECTOR		DATE

CONCRETE BARRIER
F-SHAPE
INSTALLATION

STANDARD DRAWING TITLE

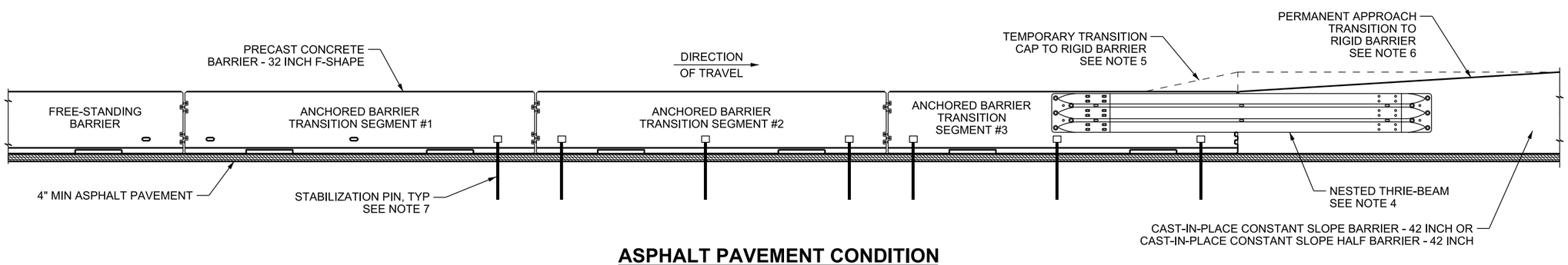
STD. DWG. NO.

BA 1F1



CONCRETE PAVEMENT CONDITION

TRAFFIC SIDE - LEFT SHOULDER INSTALLATION SHOWN,
RIGHT SHOULDER SIMILAR



ASPHALT PAVEMENT CONDITION

TRAFFIC SIDE - LEFT SHOULDER INSTALLATION SHOWN,
RIGHT SHOULDER SIMILAR

TRANSITION FROM FREE-STANDING TO RIGID BARRIER

SEE NOTES 1 AND 8

NOTES:

1. DO NOT USE THIS TRANSITION TO CONNECT TO BRIDGE PARAPET.
2. INSTALL TRANSITION AFTER SITE PREPARATION IS COMPLETE.
3. INSTALL BARRIER STABILIZATION PINS BEFORE THRIE-BEAM TERMINAL CONNECTORS, THRIE-BEAM ELEMENTS, AND FIELD SIDE STRAP.
4. NEST TWO THRIE-BEAM ELEMENTS PER TRANSITION. SEE STD DWG BA 1F4 FOR THRIE-BEAM DETAILS.
5. USE TRANSITION CAP FOR TEMPORARY APPROACH TRANSITIONS OF PRECAST CONCRETE BARRIER - 32 INCH F-SHAPE TO CAST-IN-PLACE CONCRETE BARRIER - 42 INCH CONSTANT SLOPE. SEE STD DWG BA 1F4 FOR TEMPORARY TRANSITION CAP DETAILS.
6. DO NOT USE TEMPORARY TRANSITION CAP FOR PERMANENT APPROACH TRANSITIONS OF FREE-STANDING PRECAST F-SHAPE BARRIER TO CAST-IN-PLACE CONSTANT SLOPE BARRIER. SEE STD DWGS BA 3A2, 3K3, AND 3M2 FOR CAST-IN-PLACE TRANSITION DETAILS.
7. INSTALL ONE STABILIZATION PIN IN THE SLOT OF THE LAST FREE-STANDING SEGMENT CLOSEST TO THE FIRST PINNED SEGMENT WHEN TRANSITIONING FROM FREE-STANDING TO PINNED BARRIER.
8. TRANSITION FIRST TO PINNED PRECAST BARRIER (MINIMUM THREE SEGMENTS), THEN TO RIGID BARRIER WHEN TRANSITIONING FROM FREE-STANDING BARRIER TO RIGID BARRIER.

SUPPLEMENTAL DRAWING

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	NEW DRAWING.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SCALE: NOT TO SCALE

RECOMMENDED FOR APPROVAL — OCT. 31, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — OCT. 31, 2019 — DATE

DEPUTY DIRECTOR — DATE

FREE STANDING BARRIER
F-SHAPE, CAST-IN-PLACE
BARRIER TRANSITION
1 OF 3

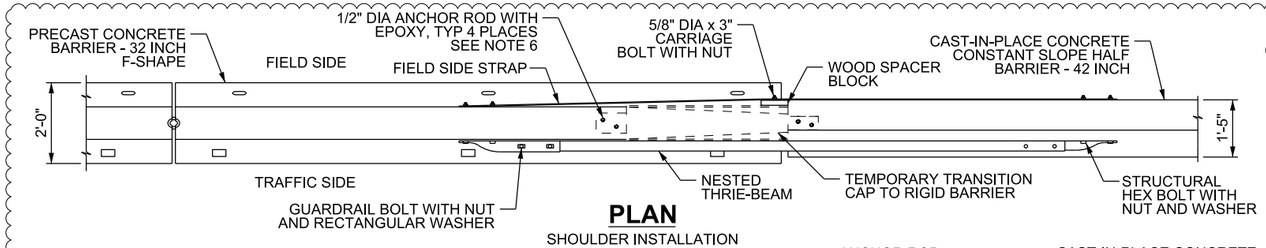
STANDARD DRAWING TITLE

STD. DWG. NO.

BA 1F2

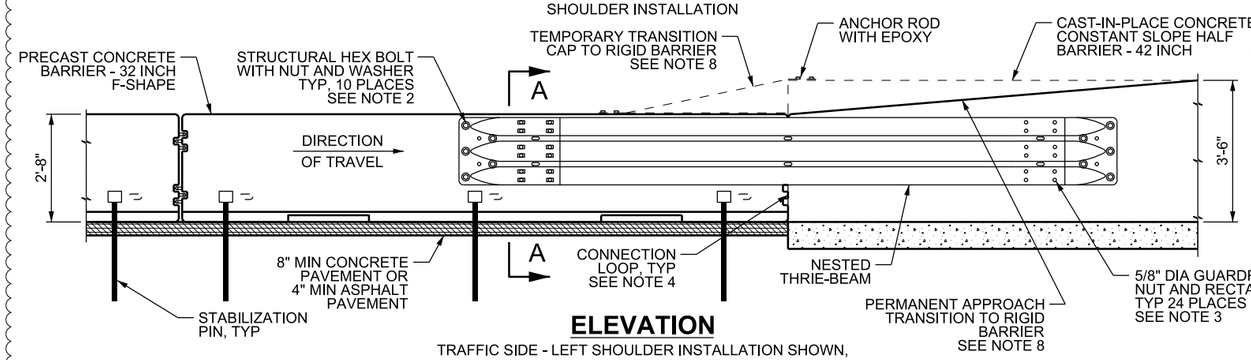
DGN File: D:\Standardsandspecssection\Standards Committee\MeetingFiles\2019\6-October 31, 2019\Incoming\SAF - Shawn\3-AgendaVersion\BA F Shape Barrier\BA0IF2.dgn

16-OCT-2019



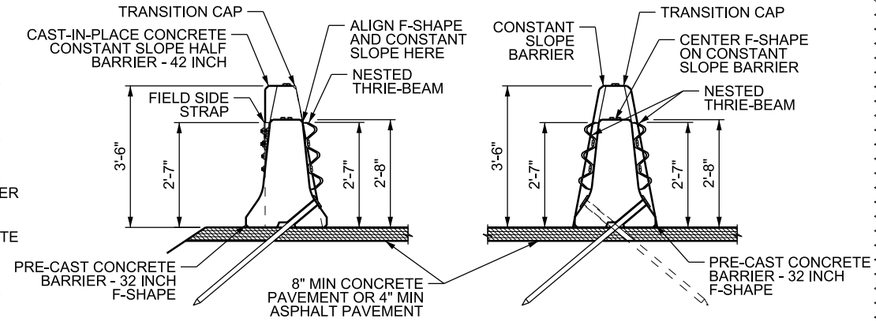
PLAN

SHOULDER INSTALLATION



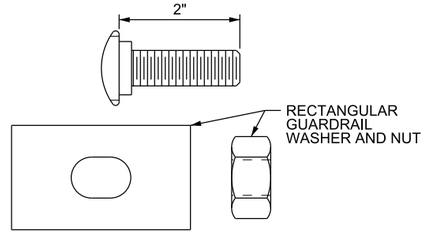
ELEVATION

TRAFFIC SIDE - LEFT SHOULDER INSTALLATION SHOWN, RIGHT SHOULDER SIMILAR



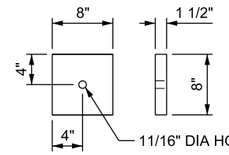
SECTION A-A

SECTION B-B

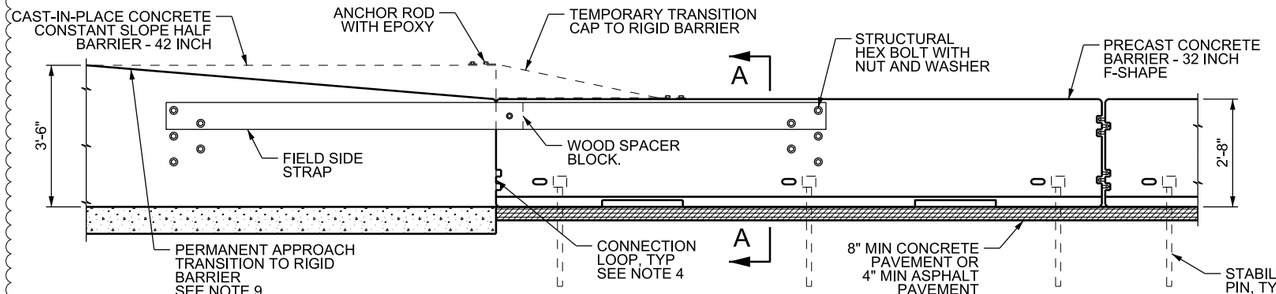


GUARDRAIL BOLT

SEE NOTE 7

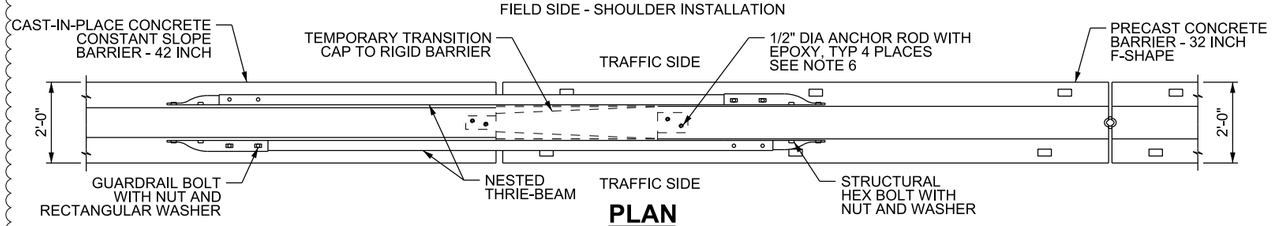


WOOD SPACER BLOCK DETAIL



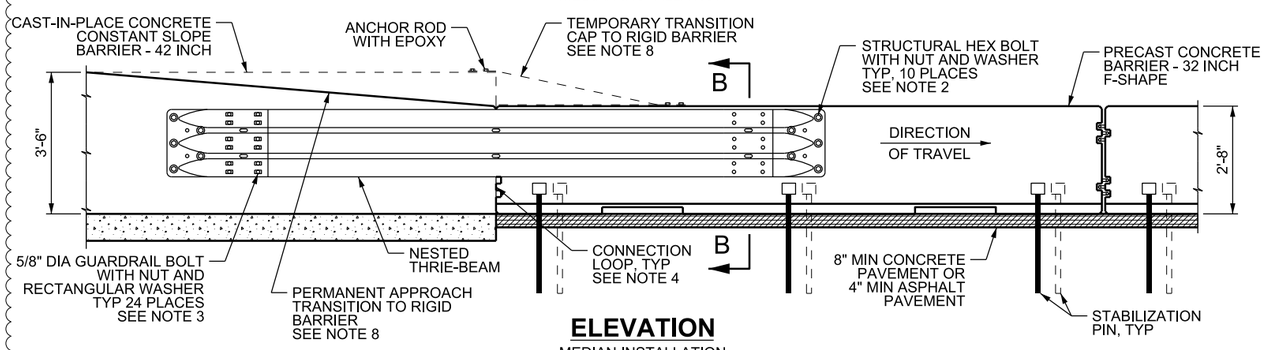
ELEVATION

FIELD SIDE - SHOULDER INSTALLATION



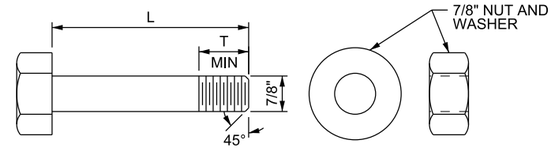
PLAN

MEDIAN INSTALLATION



ELEVATION

MEDIAN INSTALLATION



BOLT LOCATION	SHOULDER		MEDIAN	
	L	T	L	T
CONSTANT SLOPE FULL BARRIER	1'-10"	9"	2'-0"	11"
CONSTANT SLOPE HALF BARRIER	1'-4"	7"	1'-6"	9"
F-SHAPE BARRIER				

STRUCTURAL HEX BOLT

SEE NOTE 5

NOTES:

1. INSTALL CONNECTION HARDWARE ACCORDING TO SECTION A-A OR SECTION B-B. USE BOLTS LONG ENOUGH THAT THE NUT WILL HAVE FULL ENGAGEMENT OF THE BOLT AND NO MORE THAN 1/4 INCH TO 1/2 INCH OF THE BOLT IS ABOVE THE NUT. CUT AND FIELD COAT BOLT WITH A ZINC COMPOUND WITH BOLT EXCEEDS 1/2 INCH ABOVE THE NUT.
2. CORE DRILL 1 INCH DIAMETER HOLE FOR 7/8 INCH BOLTS. DO NOT USE A ROTARY PERCUSSION DRILL.
3. INSTALL RECTANGULAR GUARDRAIL WASHER UNDER THE GUARDRAIL BOLT HEAD ON UPSTREAM END. INSTALL RECTANGULAR GUARDRAIL WASHER UNDER NUT ON DOWNSTREAM END. SEE "EXPANDED VIEW THRIE-BEAM TERMINAL CONNECTOR TO GUARDRAIL" ON STD DWG BA 1F4 FOR ADDITIONAL INFORMATION.
4. FIELD CUT CONNECTION LOOPS ON PRECAST BARRIER ADJACENT TO RIGID BARRIER. PLACE PRECAST BARRIER TIGHT AGAINST RIGID BARRIER.
5. USE STRUCTURAL HEX BOLTS CONFORMING TO ASTM F 3125, GRADE A 325. USE HARDENED WASHERS AND HEAVY HEX NUTS ACCORDING TO ASTM F 436 AND A 563, RESPECTIVELY. HOT DIP GALVANIZE ACCORDING TO ASTM A 153.
6. USE GALVANIZED THREADED ANCHOR RODS CONFORMING TO ASTM C 1554, GRADE 55 AND WASHERS AND NUTS ACCORDING TO ASTM F 436 AND A 563 RESPECTIVELY. EMBED ANCHOR RODS AT LEAST 5 INCH AND BOND WITH EPOXY RESIN ACCORDING TO AASHTO M 235 TYPY IV.
7. USE GUARDRAIL BOLTS CONFORMING TO ASTM A 307 AND ACCORDING TO TASK FORCE 13 REPORT, FBB02. USE RECESSED GUARDRAIL NUTS AND RECTANGULAR GUARDRAIL WASHER ACCORDING TO TASK FORCE 13 REPORT, FWR03.
8. SEE STD DWG BA 1F2 FOR PERMANENT AND TEMPORARY APPLICATION GUIDELINES.
9. STABILIZATION PINS SHOWN FOR ASPHALT PAVEMENT CONDITION. SEE STD DWG BA 1F2 FOR STABILIZATION PIN PLACEMENT FOR CONCRETE PAVEMENT CONDITION.

SUPPLEMENTAL DRAWING

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	NEW DRAWING.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — OCT. 31, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — OCT. 31, 2019 — DATE

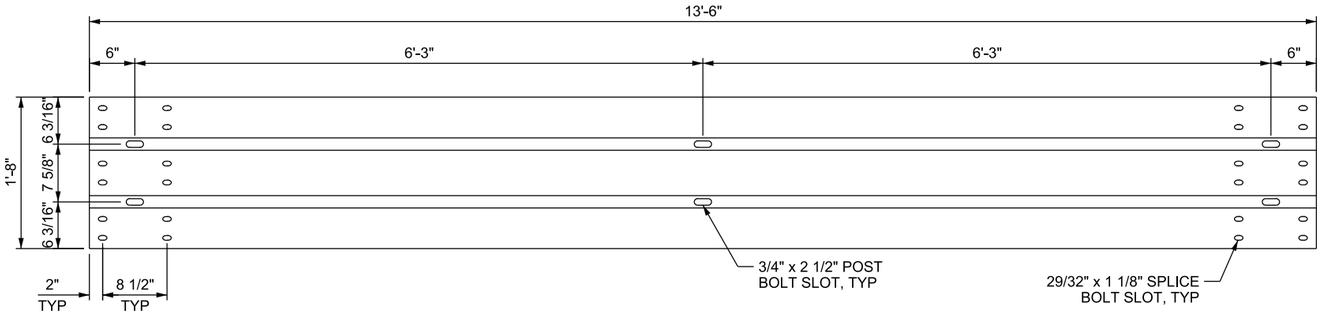
DEPUTY DIRECTOR

FREE STANDING BARRIER
F-SHAPE, CAST-IN-PLACE
BARRIER TRANSITION
2 OF 3

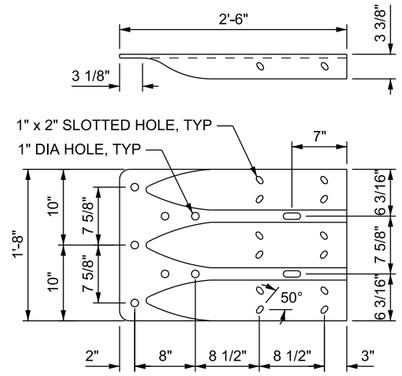
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 1F3

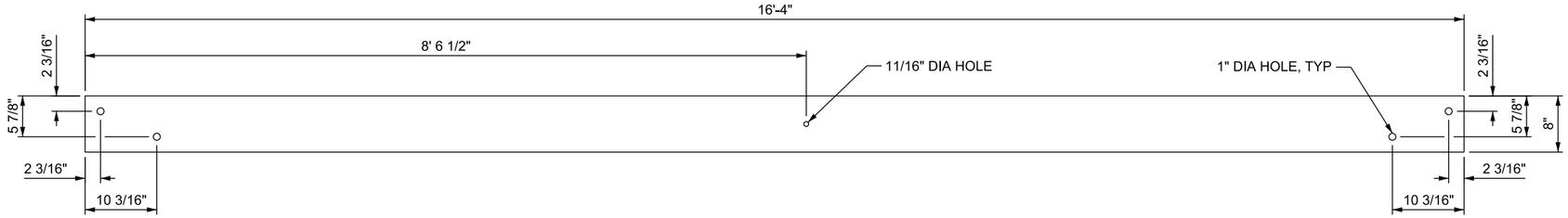
DGN File: D:\StandardsAndSpecsSection\Standards Committee\MeetingFiles\2019\16-October 31, 2019\Incoming\BA F Shape Barrier\BA0IF3.dgn
16-OCT-2019



2-SPACE THRIE-BEAM GUARDRAIL

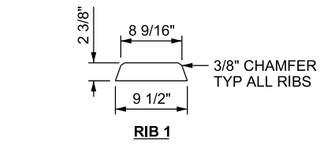


THRIE-BEAM TERMINAL CONNECTOR

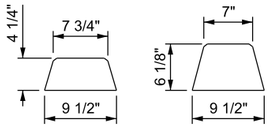


FIELD SIDE STRAP DETAIL

SEE NOTE 1

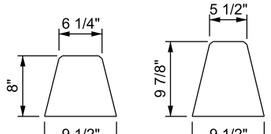


RIB 1



RIB 2

RIB 3

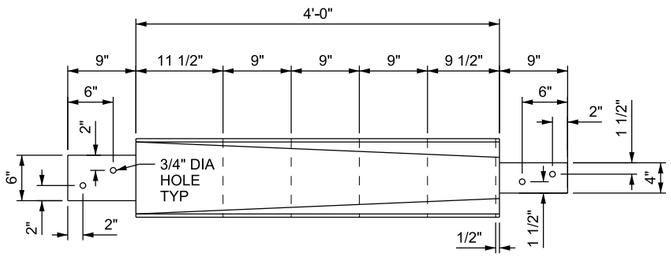


RIB 4

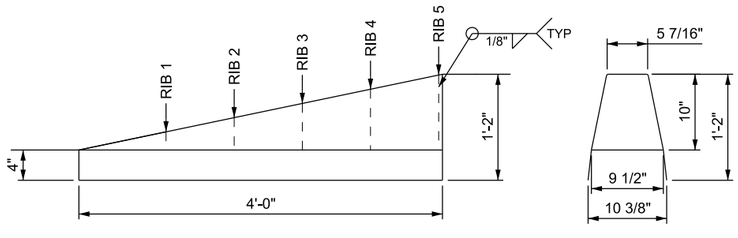
RIB 5

RIB DETAILS

SEE NOTE 3



PLAN

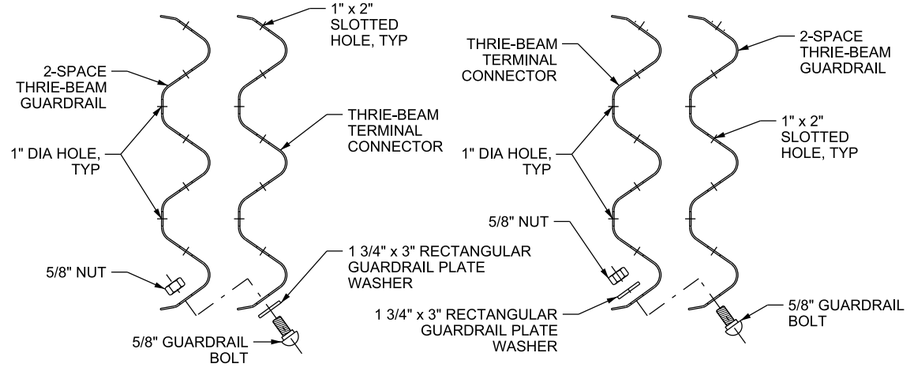


ELEVATION

END VIEW

TRANSITION CAP DETAIL

SEE NOTES 1 AND 2



UPSTREAM END **DOWNSTREAM END**

EXPANDED VIEW THRIE-BEAM TERMINAL CONNECTOR TO GUARDRAIL

NOTES:

1. USE 1/8 INCH THICK ASTM A 36 STEEL PLATE FOR THE TRANSITION CAP. USE 1/4 INCH THICK ASTM A 36 STEEL PLATE FOR FIELD SIDE STRAP. GALVANIZE ACCORDING TO AASHTO M 111 AFTER FABRICATION.
2. THE TOP, SIDES, AND CONNECTION TABS OF THE TRANSITION CAP MAY BE FABRICATED FROM SEPARATE PLATES AND WELDED TOGETHER AT THE JOINTS, A SINGLE BENT PLATE, OR A COMBINATION OF THE TWO. USE A MAXIMUM 1/4 INCH BEND RADIUS FOR TRANSITION CAPS FABRICATED FROM A SINGLE PLATE.
3. RIB PLATE DIMENSIONS ARE BEFORE FABRICATION OF CHAMFERS.
4. USE 10 GAUGE THRIE-BEAM TERMINAL CONNECTION ACCORDING TO TASK FORCE 13 REPORT, RTE01B.
5. USE 12 GAUGE 2-SPACE THRIE-BEAM GUARDRAIL ACCORDING TO TASK FORCE 13 REPORT, RTM02A.

SUPPLEMENTAL DRAWING

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	NEW DRAWNG.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — OCT. 31, 2019 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — OCT. 31, 2019 DATE

DEPUTY DIRECTOR

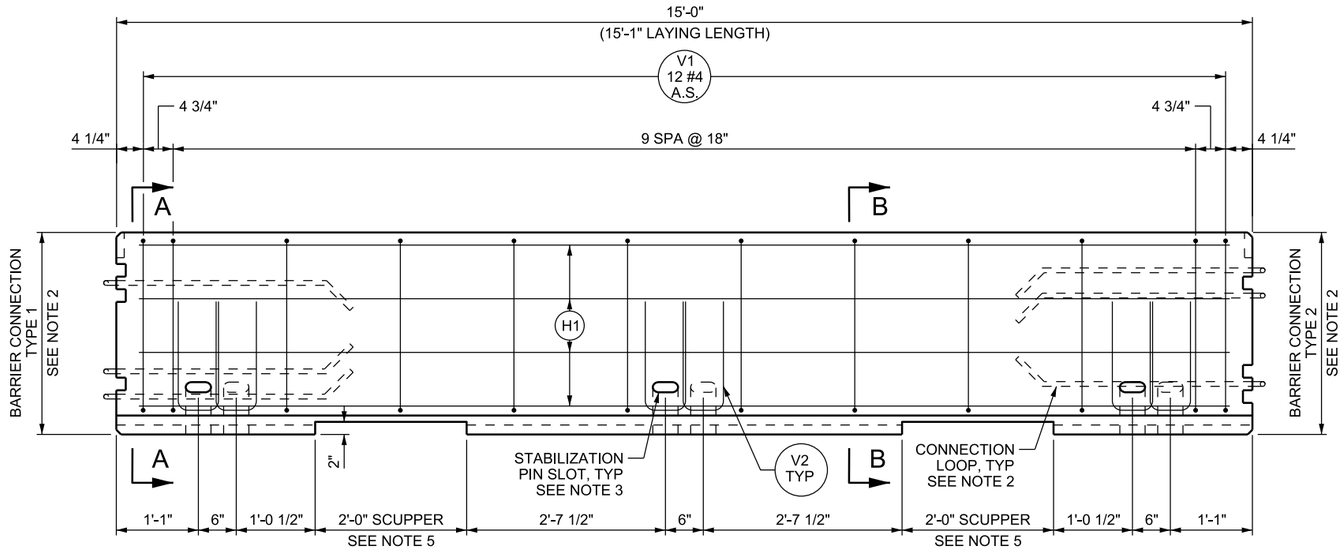
FREE STANDING BARRIER
F-SHAPE, CAST-IN-PLACE
BARRIER TRANSITION
3 OF 3

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 1F4

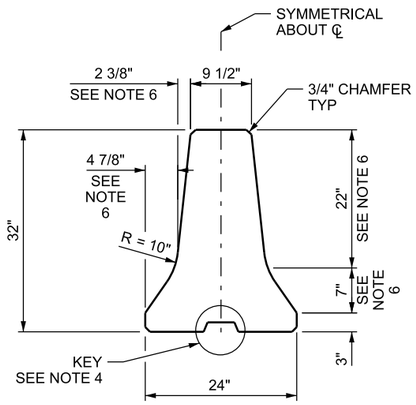
DGN File: D:\Standards and Specs Section\Standards Committee\MeetingFiles\2019\6-October 31, 2019\Incoming\SAF - Shawn\3-AgendaVersion\BA F Shape Barrier\BA0IF4.dgn

16-OCT-2019

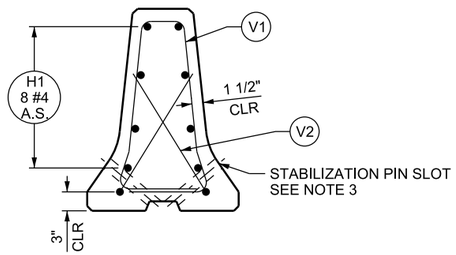


ELEVATION

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#4	8	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	14'-6"
V1	#4	12	VERTICAL IN BARRIER TOTAL LENGTH = 6'-10"	6 3/8"; 10 3/4"; 6 1/2"; 1 1/2" R TYP; 10 3/4"; 1'-2 7/8"; 2'-3"
V2	#4	6	VERTICAL BAR AROUND SLOTS TOTAL LENGTH = 4'-0"	1'-10"; 6 3/8"; 1 1/2" R TYP



SECTION A-A
DIMENSIONS



SECTION B-B
REINFORCING

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR DETAILS.
3. SEE "F-SHAPE BARRIER STABILIZATION PIN DETAILS" ON STD DWG BA 1A2 FOR DETAILS.
4. SEE "KEY DETAIL" ON STD DWG BA 1A2 FOR DETAILS.
5. PROVIDE SCUPPERS WHEN SHOWN.
6. MEASURED TO INTERSECTION OF BARRIER SLOPES.
7. EACH BARRIER UNIT WEIGHTS 3.6 TONS.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	ENTIRE DRAWING REVISED.

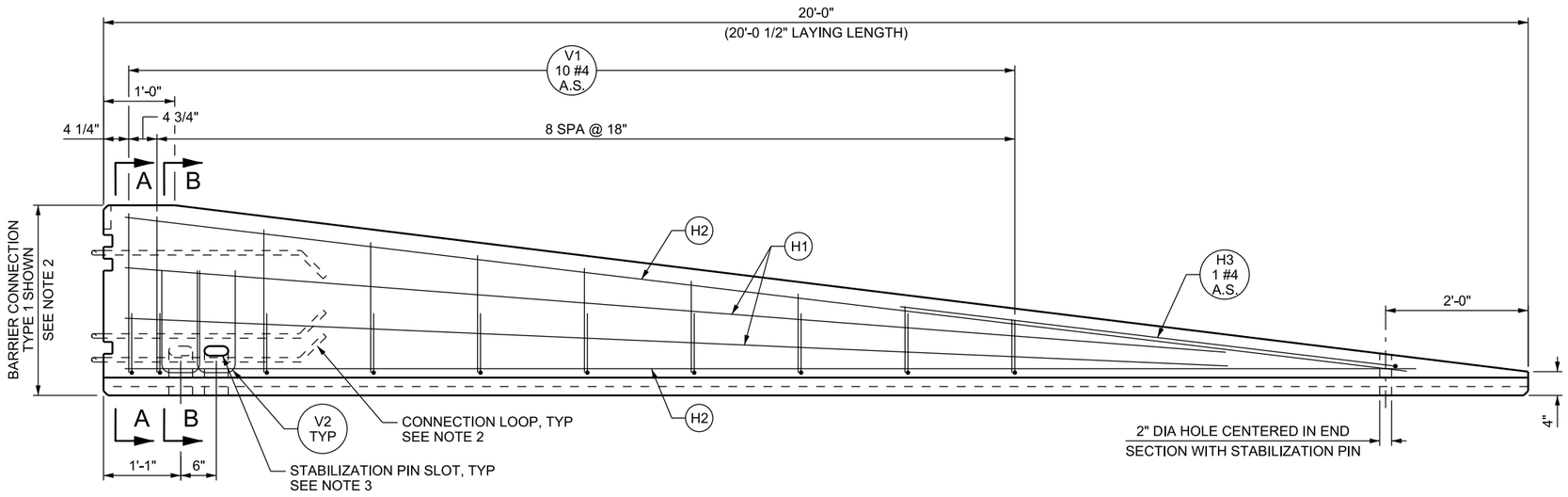
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — OCT. 31, 2019 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — OCT. 31, 2019 — DATE
DEPUTY DIRECTOR

PRECAST CONCRETE BARRIER - 32 INCH F-SHAPE

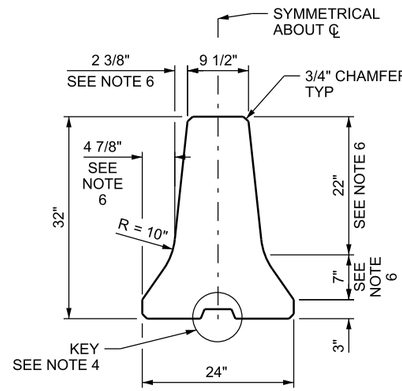
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 2A

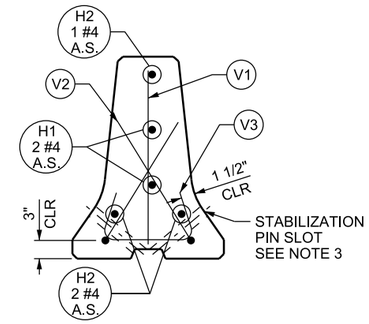


ELEVATION

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#4	2	HORIZONTAL IN BARRIER	13'-3"
H2	#4	3	HORIZONTAL IN BARRIER	19'-1
H3	#4	1	HORIZONTAL IN BARRIER TOTAL LENGTH = 15'-6"	7'-0", 85°, TYP, 1'-6"
V1	#4	10	VERTICAL IN BARRIER	L / QTY: 27" 2; 25" 1; 23" 1; 21" 1; 19" 1; 17" 1; 15" 1; 13" 1; 11" 1
V2	#4	2	VERTICAL BAR AROUND SLOTS TOTAL LENGTH = 4'-0"	1'-10", 6 3/8", 1 1/2" R TYP
V3	#4	10	VERTICAL IN BARRIER TOTAL LENGTH = 2'-8"	8 1/2", 10", 1 1/2" R TYP, 1'-2 7/8"



SECTION A-A
DIMENSIONS



SECTION B-B
REINFORCING

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR DETAILS. USE THE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
3. SEE "F-SHAPE BARRIER STABILIZATION PIN DETAILS" ON STD DWG BA 1A2 FOR DETAILS.
4. SEE "KEY DETAIL" ON STD DWG BA 1A2 FOR DETAILS.
5. PROVIDE SCUPPERS WHEN SHOWN.
6. MEASURED TO INTERSECTION OF BARRIER SLOPES.
7. USE SLOPED END SECTION AS ALLOWED ON STD DWG BA 1D.
8. USE PERMITTED IN WORK ZONES WHEN SPEED IS 40 MPH OR LESS BEFORE THE START OF THE CONSTRUCTION PROJECT.
9. EACH BARRIER UNIT WEIGHS 3.0 TONS.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	ENTIRE DRAWING REVISED.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — OCT. 31, 2019 DATE

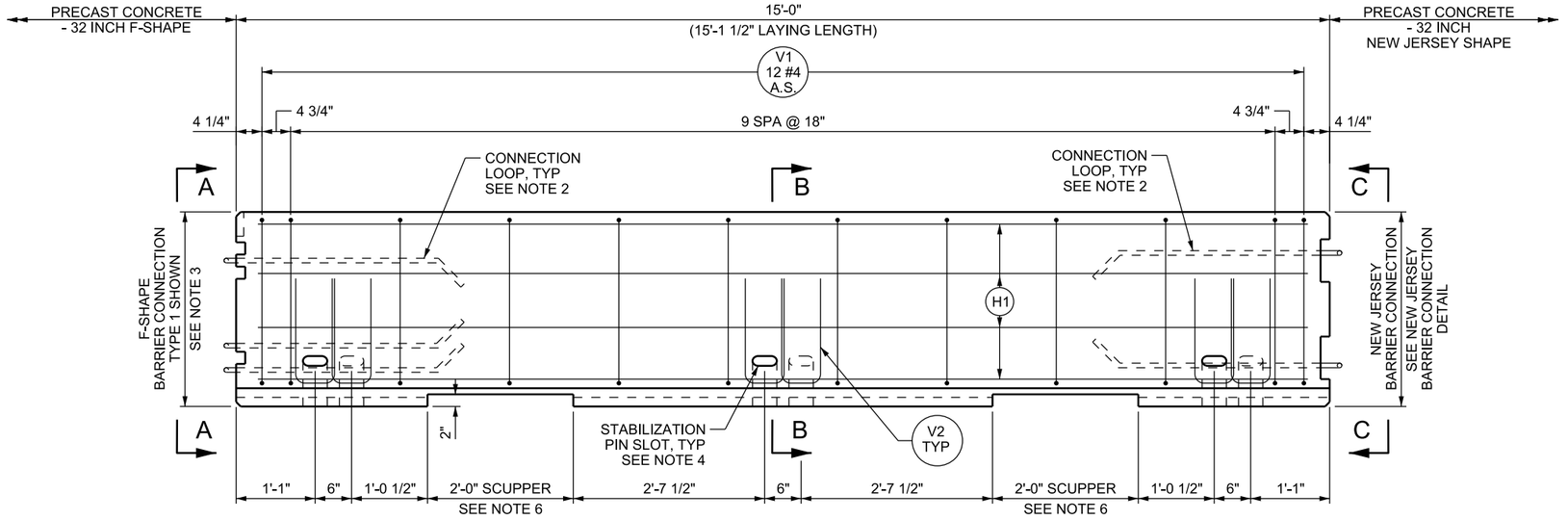
CHAIRMAN STANDARDS COMMITTEE APPROVED — OCT. 31, 2019 DATE

DEPUTY DIRECTOR

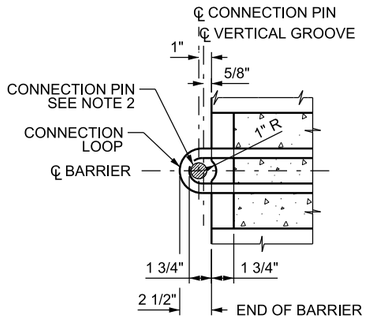
PRECAST CONCRETE BARRIER, 32 INCH F-SHAPE SLOPED END SECTION (FOR SPEEDS ≤ 40 MPH)

STANDARD DRAWING TITLE

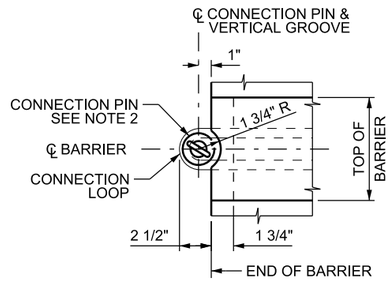
STD. DWG. NO.
BA 2B



ELEVATION

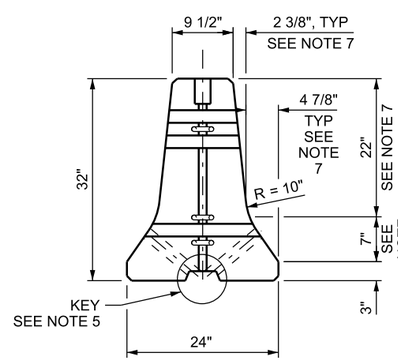


LOOP PLACEMENT

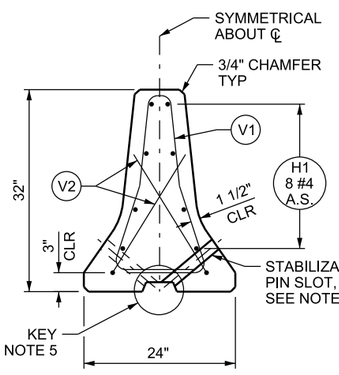


PIN ACCESS

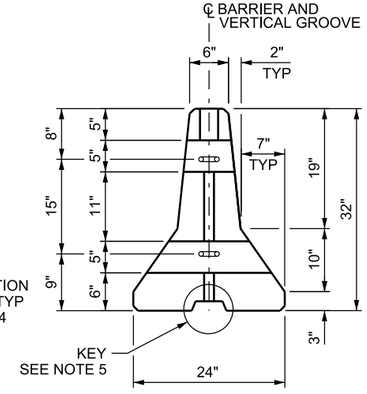
NEW JERSEY BARRIER CONNECTION DETAIL



VIEW A-A
F-SHAPE BARRIER END



SECTION B-B



VIEW C-C
NEW JERSEY BARRIER END

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#4	8	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	14'-6"
V1	#4	12	VERTICAL IN BARRIER TOTAL LENGTH = 6'-8"	9 1/2", 3 3/4", 7", 1 1/2" R TYP, 10 3/4", 1'-2 7/8", 2'-3"
V2	#4	6	VERTICAL BAR AROUND SLOTS TOTAL LENGTH = 4'-0"	1'-10", 6 3/8", 1 1/2" R TYP

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR F-SHAPE CONNECTION LOOP AND CONNECTION PIN DETAILS.
3. USE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER. SEE STD DWG BA 1A2.
4. SEE "F-SHAPE BARRIER STABILIZATION PIN DETAILS" ON STD DWG BA 1A2 FOR DETAILS.
5. SEE "KEY DETAIL" ON STD DWG BA 1A2 FOR DETAILS.
6. PROVIDE SCUPPERS WHEN SHOWN.
7. MEASURED TO INTERSECTION OF BARRIER SLOPES.
8. USE WITH PRECAST CONCRETE BARRIER AND CAST-IN-PLACE BARRIER.
8. EACH BARRIER UNIT WEIGHS 3.4 TONS.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	NEW DRAWING.

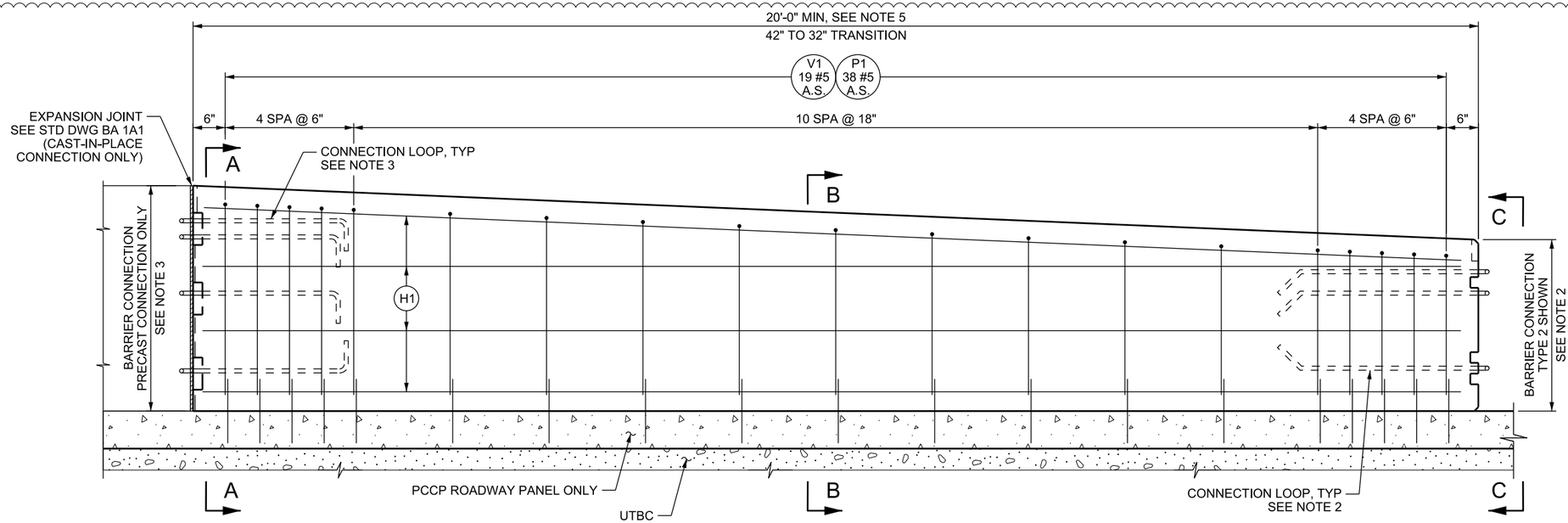
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

	DATE
RECOMMENDED FOR APPROVAL	OCT. 31, 2019
CHAIRMAN STANDARDS COMMITTEE APPROVED	OCT. 31, 2019
DEPUTY DIRECTOR	DATE

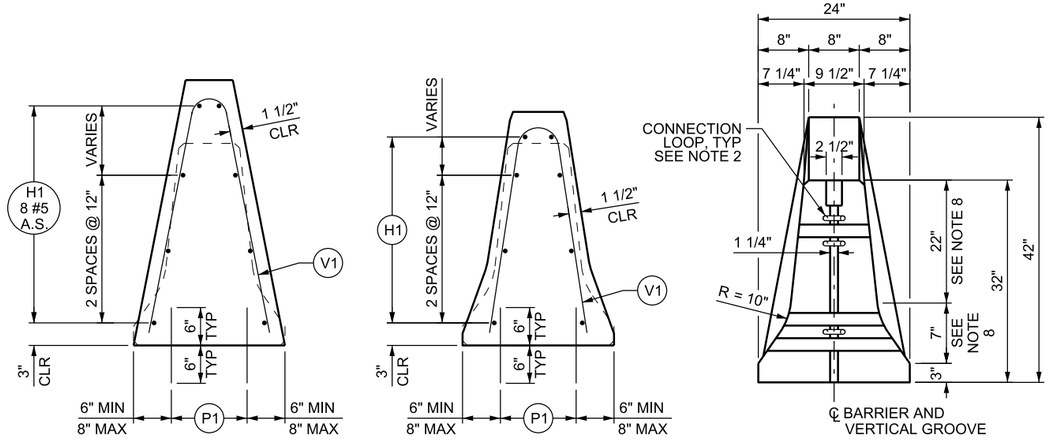
PRECAST CONCRETE
BARRIER - 32 INCH
F-SHAPE,
NEW JERSEY SHAPE
TRANSITION

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 2C



ELEVATION



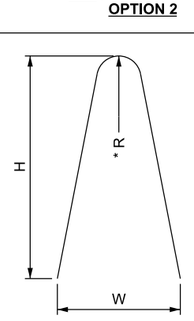
SECTION A-A

SECTION B-B

VIEW C-C

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	8	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	19'-5"
P1	#8	38	PAVEMENT TO BARRIER THROUGH LIMITS OF BARRIER (VERTICAL)	12" OPTION 1; 12", 3" OPTION 2
V1	#5	19	VERTICAL IN BARRIER	see table below

H	W	QTY
36 1/2"	20"	1
36"	19 1/2"	2
35 1/2"	19 1/2"	1
35 1/2"	19"	1
34 1/2"	18 1/2"	1
34"	18"	1
33"	17 1/2"	1
32 1/2"	17"	1
31 1/2"	16 1/2"	1
31"	16"	1
30"	15 1/2"	1
29 1/2"	14 1/2"	1
28 1/2"	14"	1
28"	13 1/2"	1
27 1/2"	13 1/2"	2
27"	13"	2



* BEND RADIUS VARIES OVER LENGTH OF BARRIER TRANSITION SECTION

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR DETAILS. USE THE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
3. SEE "CONSTANT SLOPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A3 FOR DETAILS. USE THE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
4. BARRIER SHAPE VARIES LINEARLY OVER LENGTH OF BARRIER TRANSITION.
5. BARRIER TRANSITIONS MAY BE LENGTHENED, WITH ENGINEER'S APPROVAL, TO ELIMINATE A GAP BETWEEN PRECAST AND CAST-IN-PLACE SECTIONS. REINFORCING SHOWN IS FOR 20 FOOT LENGTH. UPDATE VERTICAL REINFORCING IF LENGTH IS INCREASED. DO NOT EXCEED SPACING SHOWN.
6. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM.
7. THE ENGINEER APPROVES CONTRACTOR DEVISED METHOD OF POSITIONING THE LONGITUDINAL REINFORCING STEEL ± 1/2 INCH AS DIMENSIONED.
8. MEASURED TO INTERSECTION OF BARRIER SLOPES. CONSTRUCT 10 INCH RADIUS TO PROVIDE A SMOOTH TRANSITION BETWEEN SLOPES.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	ENTIRE DRAWING REVISED.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — OCT. 31, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — OCT. 31, 2019 — DATE

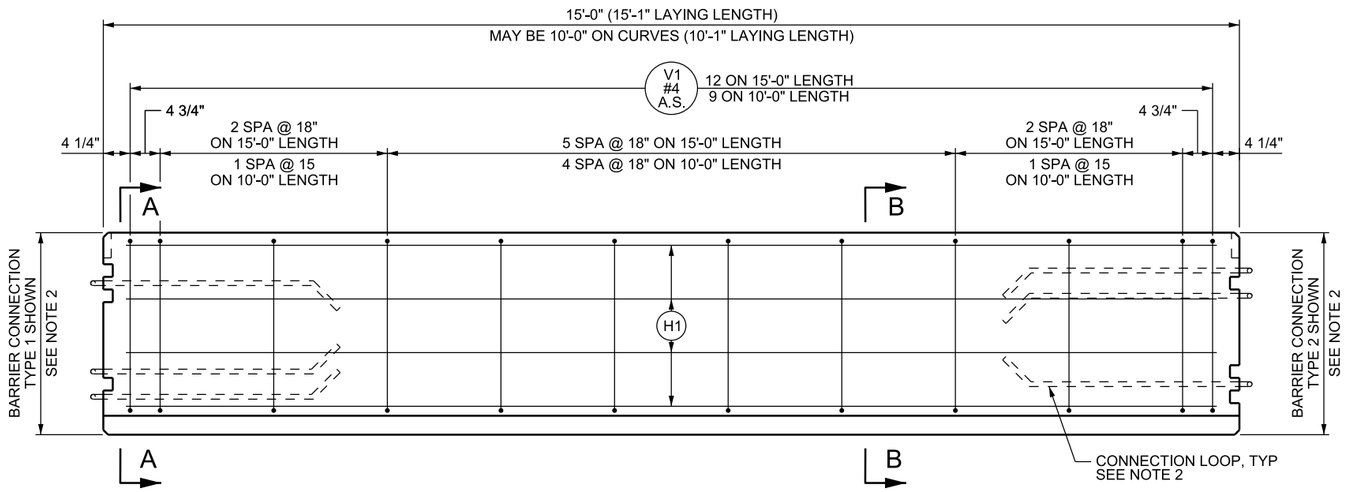
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE BARRIER - 32 INCH F-SHAPE, 42 INCH CONSTANT SLOPE BARRIER TRANSITION

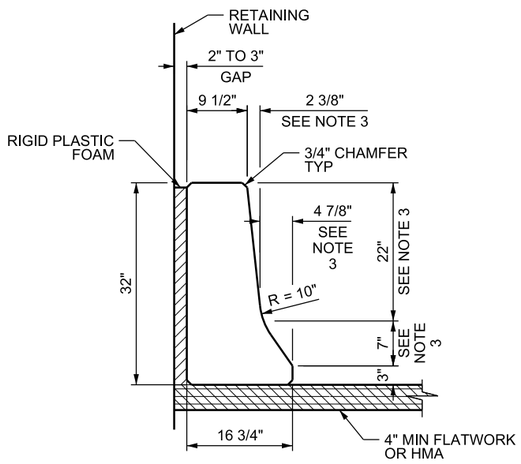
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 2D

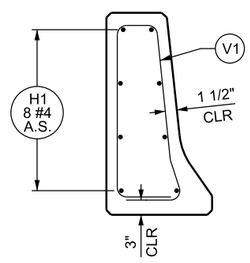
DGN File: D:\StandardsandSpecsSection\Standards Committee\MeetingFiles\2019\6-October 31, 2019\Incoming\SAF - Shawn\3-AgendaVersion\BA F Shape Barrier\BA02D.dgn
16-OCT-2019



ELEVATION



SECTION A-A
DIMENSIONS



SECTION B-B
REINFORCING

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#4	8	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	14'-6" (ON 15'-0") 9'-6" (ON 10'-0")
V1	#4	12 (ON 15'-0" LENGTH) 9 (ON 10'-0" LENGTH)	VERTICAL IN BARRIER TOTAL LENGTH = 6' 3 1/2"	6 3/8", 8 5/8", 1 1/2" R, TYP, 10 1/4", 6 1/2", 27", 7 1/2"

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR DETAILS. USE THE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
3. MEASURED TO INTERSECTION OF BARRIER SLOPES.
4. DO NOT USE AS RETAINING BARRIER. REFER TO STD DWG BA 1C FOR RETAINING BARRIER APPLICATIONS.
5. USE ONLY IN FRONT OF A RETAINING WALL. DO NOT USE IN A WORK ZONE APPLICATION.

4. BARRIER UNIT WEIGHT: 3.0 TONS (15'-0" LENGTH)
   2.0 TONS (10'-0" LENGTH)

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	ENTIRE DRAWING REVISED.

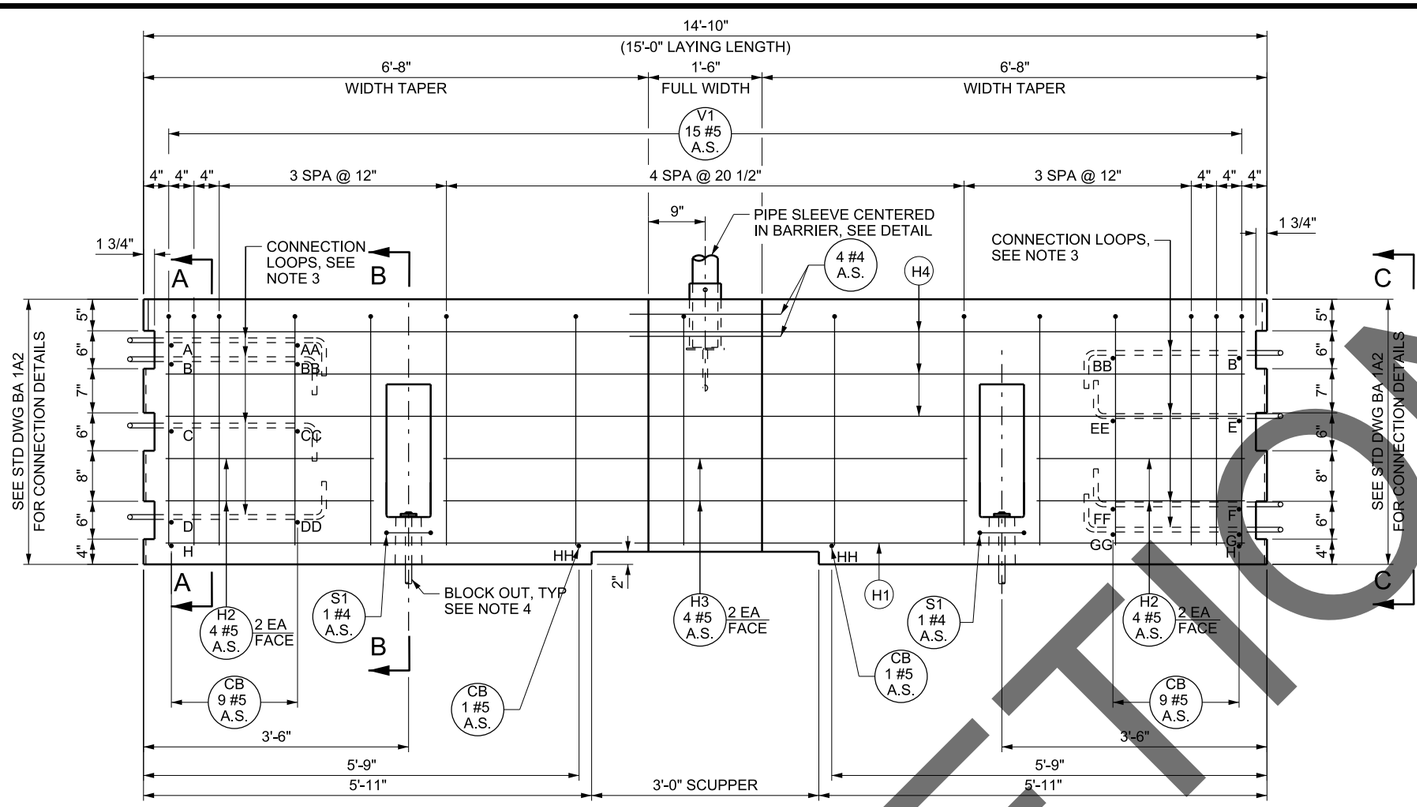
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — OCT. 31, 2019 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — OCT. 31, 2019 — DATE
DEPUTY DIRECTOR

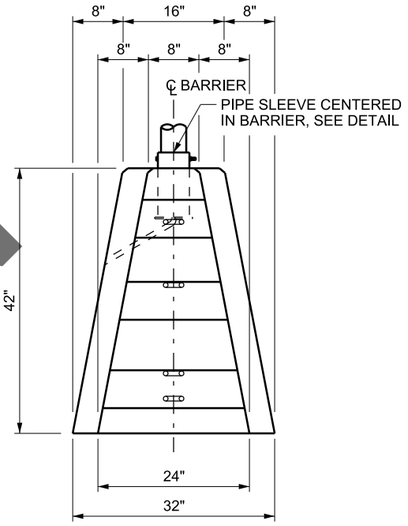
PRECAST CONCRETE
HALF BARRIER - 32 INCH
F-SHAPE
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 2E

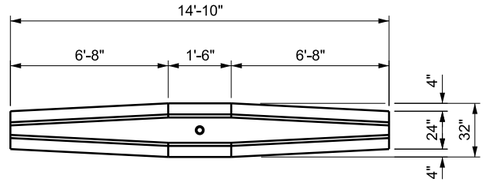
DGN File: G:\Standardsandspecs\Section\Standards Committee\MeetingFiles\2019\6-October 31, 2019\Incoming\SAF - Shawn\3-AgendaVersion\BA F Shape Barrier\BA02E 10 15.dgn
16-OCT-2019



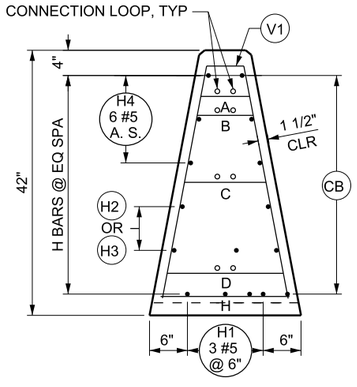
ELEVATION



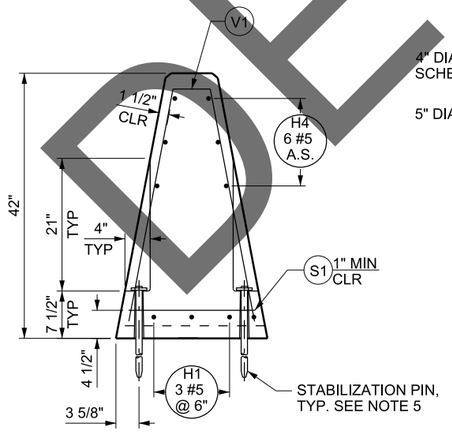
VIEW C-C



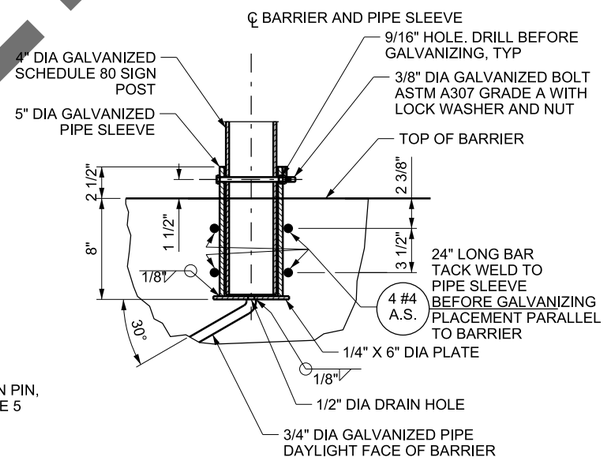
PLAN



SECTION A-A



SECTION B-B



PIPE SLEEVE DETAIL

NOTES:

1. SEE STD DWG BA 1A1 AND BA 1A2 FOR GENERAL NOTES.
2. SEE DESIGN PLAN SET WHEN BARRIER SECTIONS WITH SCUPPERS ARE REQUIRED. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
3. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
4. SEE "BARRIER BLOCK OUT AND STABILIZATION PIN" ON STD DWG BA 1A2 FOR DETAILS.
5. SEE SN SERIES STD DWG FOR SIGN MOUNTING, HARDWARE, AND PLACEMENT REQUIREMENTS. MAXIMUM SIGN PANEL AREA IS 36 SQ FT.
6. USE PIPES CONFORMING TO ASTM A 53 GRADE B, ASTM A 500 GRADE B, OR ASTM API 5L GRADE B/X42. GALVANIZE IN ACCORDANCE WITH ASTM A 123 AFTER FABRICATION IS COMPLETED.
7. SEE STD DWG BA 3I2 FOR REINFORCING STEEL SCHEDULE.
8. EACH BARRIER UNIT WEIGHS 6.6 TONS.

REVISIONS

NO.	DATE	APPR.	REMARKS

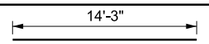
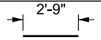
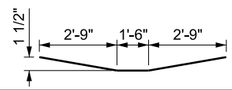
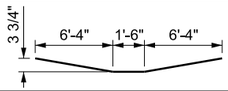
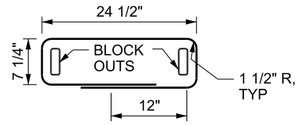
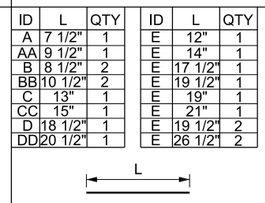
UTAH DEPARTMENT OF TRANSPORTATION
DESIGN MANUAL FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL	AUG.29, 2019	DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	AUG.29, 2019	DATE
DEPUTY DIRECTOR		

PRECAST CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, MEDIAN SMALL SIGN SECTION 1 OF 2

ROADWAY DESIGN TITLE

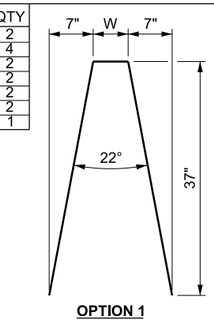
RDM. DWG. NO.
BA 3I1

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	3	HORIZONTAL IN BARRIER	
H2	#5	8	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	
H3	#5	4	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	
H4	#5	6	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	
S1	#4	2	HORIZONTAL AROUND BARRIER STABILIZATION SLOTS TOTAL LENGTH = 6'-3 1/2"	
CB	#4	20	CROSS BARS (CB) TIED TO V1 BARS	

ID	L	QTY
A	7 1/2"	1
AA	9 1/2"	1
B	8 1/2"	2
BB	10 1/2"	2
C	13"	1
CC	15"	1
D	18 1/2"	1
DD	20 1/2"	1

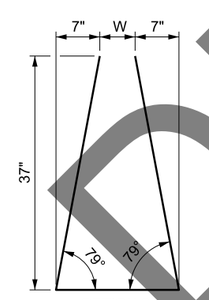
ID	L	QTY
E	12"	1
E	14"	1
E	17 1/2"	1
E	19 1/2"	1
E	19"	1
E	21"	1
E	19 1/2"	2
E	26 1/2"	2

* NOT REQUIRED WITH V1 OPTION 2 BARS

V1	#5	15	VERTICAL IN BARRIER	

W	QTY
6"	2
6 1/2"	4
8"	2
9"	2
10 1/2"	2
12 1/2"	2
13 1/2"	1

OPTION 1



OPTION 2

NOTE

1. SEE STD DWG BA 3I1 FOR LOCATION OF REINFORCEMENT.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

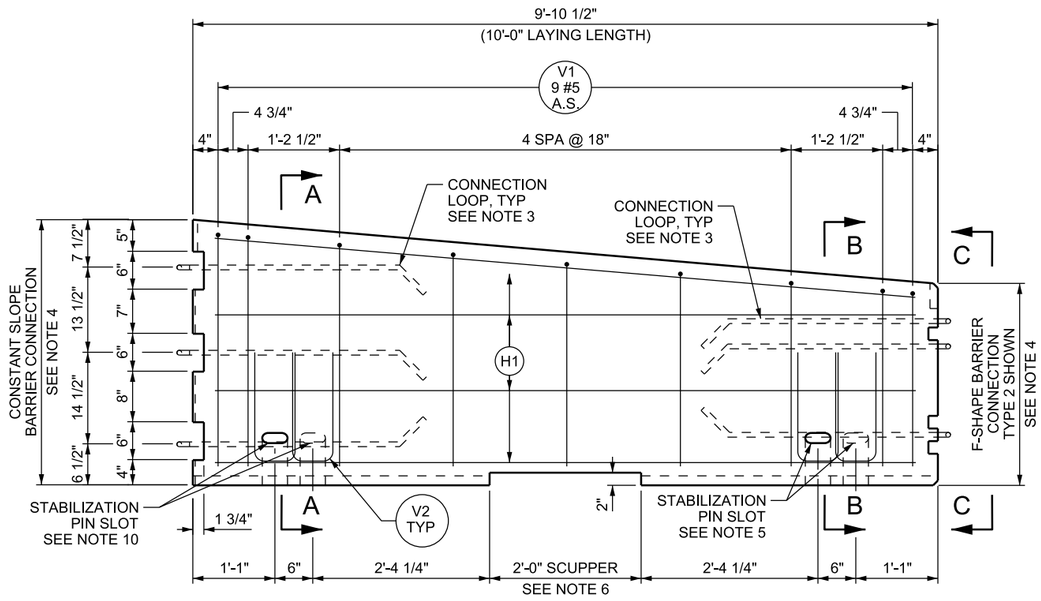
RECOMMENDED FOR APPROVAL	JAN.01, 2017	
DEPUTY DIRECTOR	DATE	
CHAIRMAN STANDARDS COMMITTEE APPROVED	JAN.01, 2017	
	DATE	

PRECAST CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, MEDIAN SMALL SIGN SECTION 2 OF 2

STANDARD DRAWING TITLE

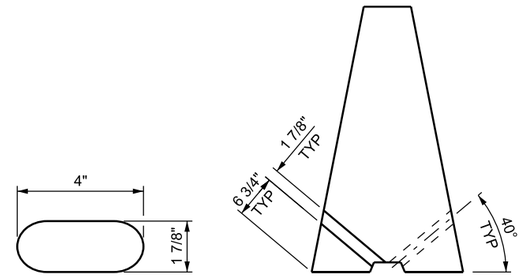
STD. DWG. NO.

BA 3I2



ELEVATION

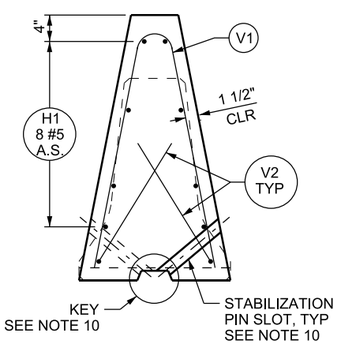
BAR MARK	BAR SIZE	NO. BARS	SKETCH	LOCATION
H1	#5	8	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	9'-3"
V1	#5	9	VERTICAL IN BARRIER	H / W / QTY: 36" / 19 1/2" / 1; 35 1/2" / 19 1/2" / 1; 34 1/2" / 18 1/2" / 1; 33" / 17 1/2" / 1; 31 1/2" / 16 1/2" / 1; 30" / 15 1/2" / 1; 28 1/2" / 14" / 1; 27 1/2" / 13 1/2" / 1; 27" / 13" / 1
V2	#4	4	VERTICAL BAR AROUND SLOTS TOTAL LENGTH = 4'-0"	1'-10"; 6 3/8"; 1 1/2" R TYP



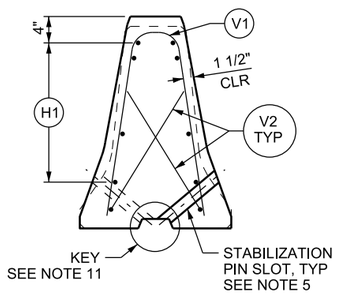
PLAN SECTION

STABILIZATION PIN SLOT

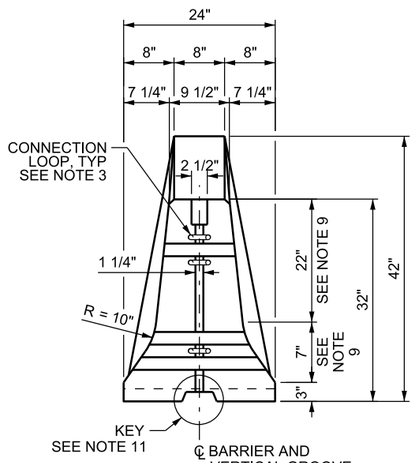
AT CONSTANT SLOPE BARRIER, SEE NOTE 10



SECTION A-A



SECTION B-B



VIEW C-C

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. USE WITH PRECAST CONCRETE CONSTANT SLOPE BARRIER ONLY.
3. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR F-SHAPE CONNECTION LOOP DETAILS.
4. USE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER. SEE STD DWGS BA 1A2 AND BA 1A3.
5. SEE "F-SHAPE BARRIER STABILIZATION PIN DETAILS" ON STD DWG BA 1A2 FOR DETAILS.
6. PROVIDE SCUPPERS WHEN SHOWN.
7. USE THIS TRANSITION SECTION WHEN A CRASH CUSHION OR W-BEAM GUARDRAIL TRANSITION IS REQUIRED ON A PRECAST CONSTANT SLOPE - 42 INCH.
8. BARRIER SHAPE VARIES LINEARLY OVER LENGTH OF BARRIER TRANSITION.
9. MEASURED TO INTERSECTION OF BARRIER SLOPES.
10. SEE "F-SHAPE BARRIER STABILIZATION PIN DETAILS" ON STD DWG BA 1A2 FOR STABILIZATION PIN MODIFICATIONS REQUIRED WITHIN LIMITS OF CONSTANT SLOPE BARRIER.
11. SEE "KEY DETAIL" ON STD DWG BA 1A2 FOR DETAILS.
12. EACH BARRIER UNIT WEIGHS 2.9 TONS.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	ENTIRE DRAWING REVISED.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

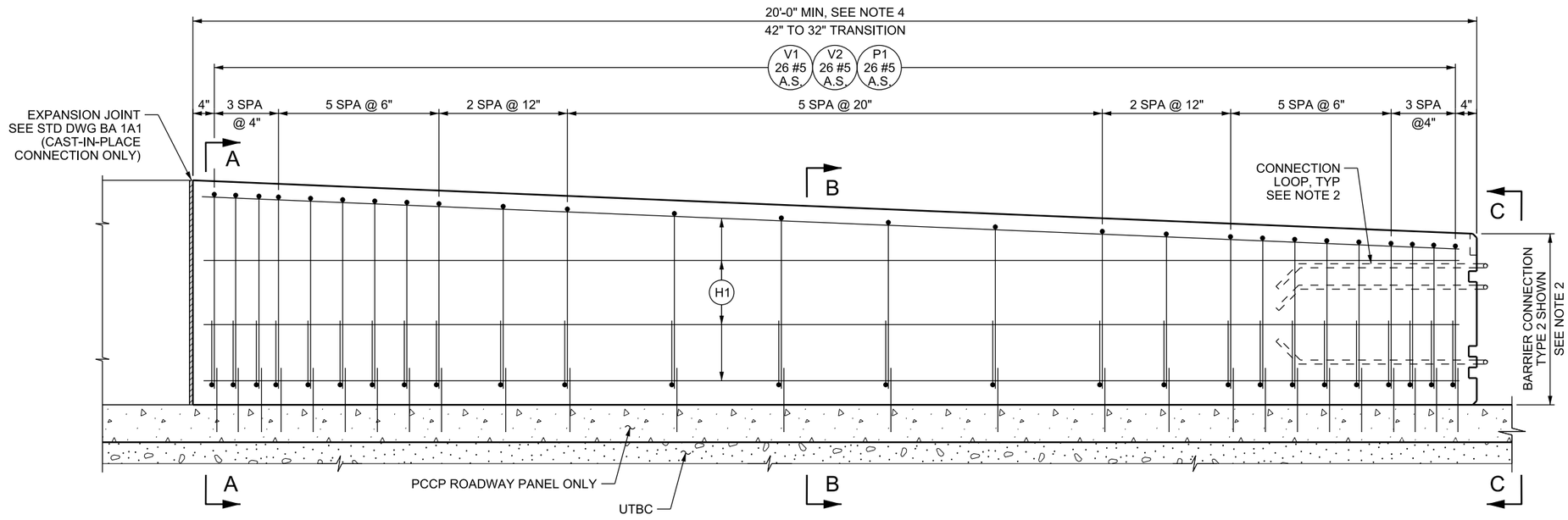
RECOMMENDED FOR APPROVAL	OCT. 31, 2019 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	OCT. 31, 2019 DATE
DEPUTY DIRECTOR	

PRECAST CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, 32 INCH F-SHAPE TRANSITION

STANDARD DRAWING TITLE

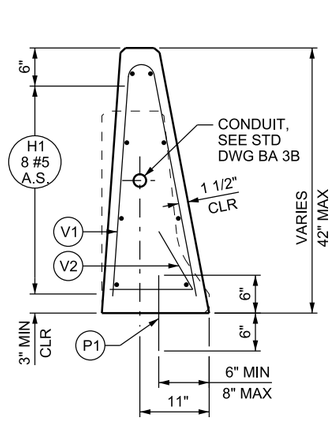
STD. DWG. NO.
BA 3J

DGN File:G:\Standards\SpecSection\Standards Committee\MeetingFiles\2019\6-October 31, 2019\Incoming\SAF - Shawn\3-AgendaVersion\BA F Shape Barrier\BA03J.dgn
16-OCT-2019

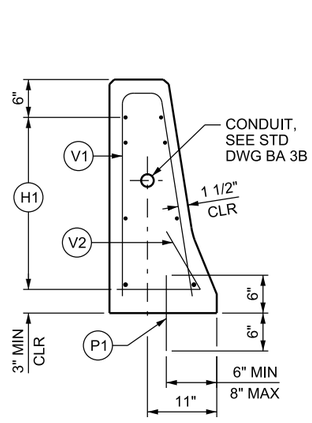


ELEVATION

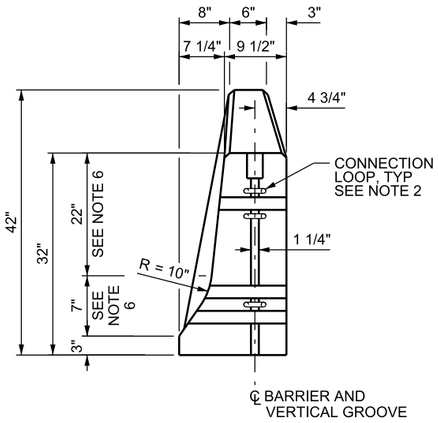
BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	8	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS CONTINUOUS THROUGH LENGTH OF BARRIER	19'-6"
P1	#5	26	PAVEMENT TO BARRIER THROUGH LIMITS OF BARRIER (VERTICAL)	12" OPTION 1; 3" 12" OPTION 2
V1	#5	26	VERTICAL IN BARRIER	H / W / QTY: 36 1/2" 13" 3; 36" 13" 1; 36" 12 1/2" 1; 35 1/2" 12 1/2" 2; 35" 12 1/2" 2; 34 1/2" 12 1/2" 1; 34" 12" 1; 33" 12" 1; 32" 11 1/2" 1; 31 1/2" 11 1/2" 1; 30 1/2" 11" 1; 29 1/2" 11" 1; 29" 10 1/2" 2; 28 1/2" 10 1/2" 1; 28" 10 1/2" 2; 27 1/2" 10 1/2" 1; 27 1/2" 10" 1; 27" 10" 3 — 1 1/2" R, H, W, OPTION 1; 3", FRONT FACE, 88°, H, W, OPTION 2
V2	#5	26	VERTICAL IN BARRIER TIE TO V1 BARS TOTAL LENGTH = 2'-1"	55°, 1'-0", 1'-1"



SECTION A-A



SECTION B-B



VIEW C-C

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR DETAILS. USE THE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
3. BARRIER SHAPE VARIES LINEARLY OVER LENGTH OF BARRIER TRANSITION.
4. BARRIER TRANSITIONS MAY BE LENGTHENED, WITH ENGINEER'S APPROVAL, TO ELIMINATE A GAP BETWEEN PRECAST AND CAST-IN-PLACE SECTIONS. REINFORCING SHOWN IS FOR 20 FOOT LENGTH. UPDATE VERTICAL REINFORCING IF LENGTH IS INCREASED. DO NOT EXCEED SPACING SHOWN.
5. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM.
6. MEASURED TO INTERSECTION OF BARRIER SLOPES.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	ENTIRE DRAWING REVISED.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — OCT. 31, 2019 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — OCT. 31, 2019 DATE

DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE HALF BARRIER - 42 INCH CONSTANT SLOPE, 32 INCH F-SHAPE BARRIER TRANSITION

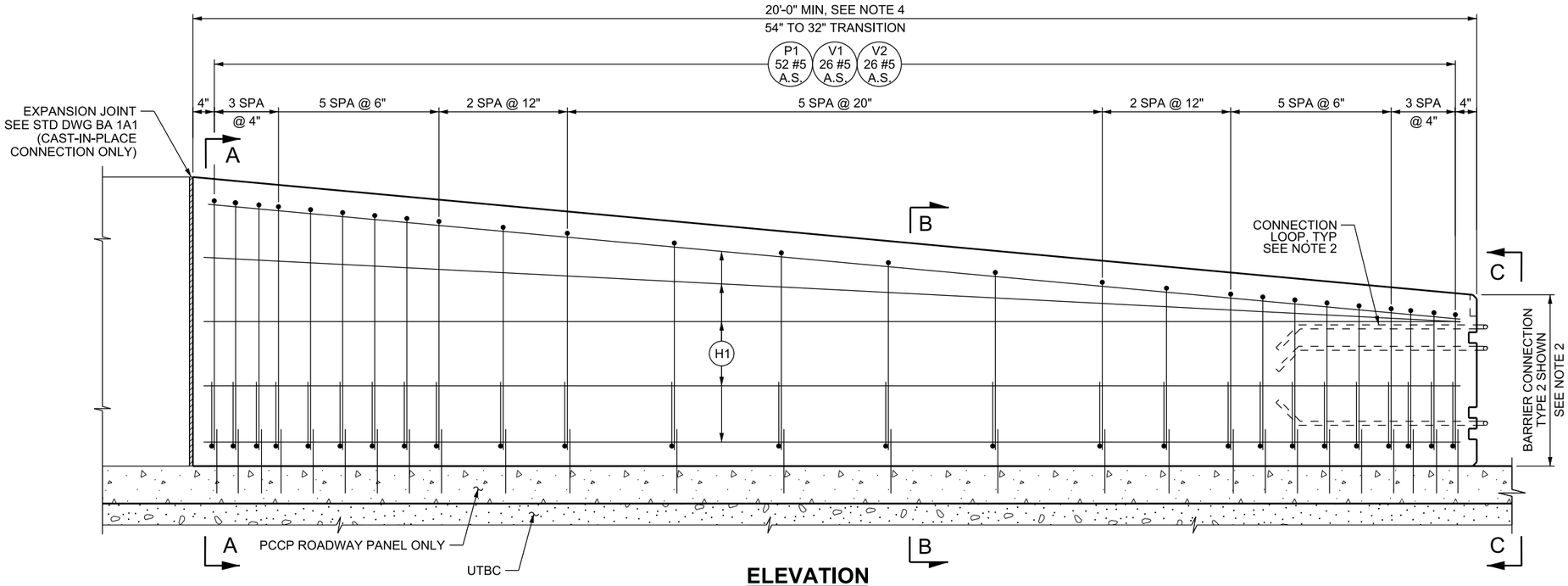
STANDARD DRAWING TITLE

STD. DWG. NO.

BA 3K5

DGN File: D:\Standardsandspecssection\Standards Committee\MeetingFiles\2019\6-October 31, 2019\Incoming\SAF - Shawn\3-AgendaVersion\BA F Shape Barrier\BA03K5.dgn

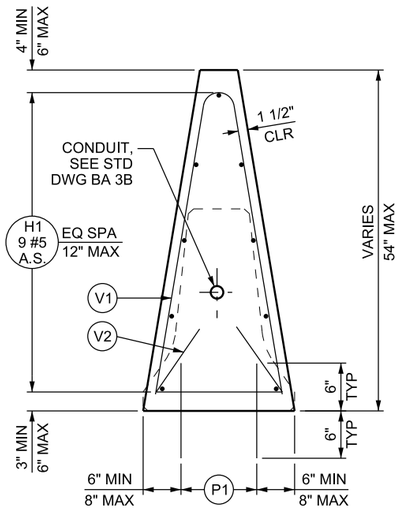
16-OCT-2019



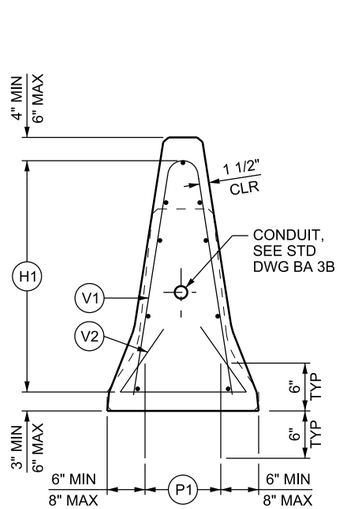
ELEVATION

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	9	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	19'-6"
P1	#5	52	PAVEMENT TO BARRIER THROUGH LIMITS OF BARRIER (VERTICAL)	12" OPTION 1; 12", 3" OPTION 2
V1	#5	26	VERTICAL IN BARRIER	H, W, 2" R
V2	#5	26	VERTICAL IN BARRIER TIE TO V1 BARS TOTAL LENGTH = 3'-7 1/2"	1'-0", 55°, 55°, 1'-0", 1'-7 1/2"

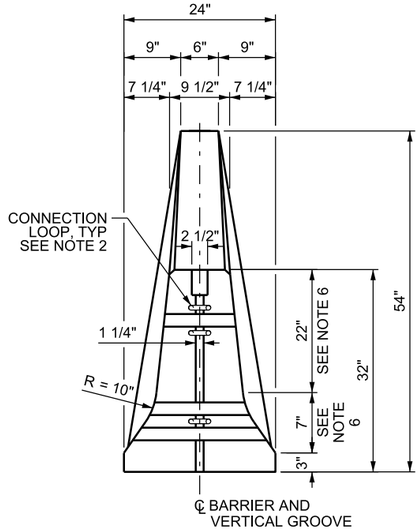
H	W	QTY
47"	20"	1
46 1/2"	19 1/2"	2
46"	19 1/2"	1
45 1/2"	19 1/2"	1
44 1/2"	19 1/2"	1
44"	19"	1
43 1/2"	19"	1
43"	19"	1
42"	18 1/2"	1
41"	18"	1
39"	17 1/2"	1
37"	17"	1
35"	16"	1
33"	15 1/2"	1
31"	15"	1
30"	14 1/2"	1
29"	14"	1
28 1/2"	14"	1
28"	14"	1
27"	13 1/2"	1
26 1/2"	13 1/2"	1
26"	13 1/2"	1
25 1/2"	13"	2
25"	13"	1



SECTION A-A



SECTION B-B



VIEW C-C

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR DETAILS. USE THE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
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5. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM.
6. MEASURED TO INTERSECTION OF BARRIER SLOPES.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	ENTIRE DRAWING REVISED.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — OCT. 31, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — OCT. 31, 2019 — DATE

DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, 32 INCH F-SHAPE BARRIER TRANSITION

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 3Q2

DGN File: G:\StandardsandSpecsSection\Standards Committee\MeetingFiles\2019\6-October 31, 2019\Incoming\SAF - Shawn\3-AgendaVersion\BA F Shape Barrier\BA0302.dgn
16-OCT-2019

Standards Committee Submittal Sheet

Name of Preparer: Michael A. Adams

Title/Position of Preparer: ITS Standards Engineer

Specification/Drawing/Item Title: Fiber Optic Communication

Specification/Drawing Number: 13594M

Priority Level (see last page for explanation) 3

Completion of paragraphs A, F, and G are mandatory. Lack of information or insufficient information will result in rejection of agenda item.

NOTES:

1. All Submittal Sheets must be completed and sent to the Standards Section by meeting the applicable Coordination due date. (See https://www.udot.utah.gov/StandardsCommitteeScheduleDates)
2. The Preparer of the Submittal Sheet or the Standards Committee member (or authorized substitute) responsible for the submittal must be present at the Standards Committee or Modified Process meeting and capable of discussing and answering all questions related to the submittal. The item will be postponed to a later meeting if one of these people is not present.
3. Notify the Standards Section immediately of any changes that impact the presentation to include absence of sponsor or delay in presentation.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard or what has caused a new or changed item of interest. **(MANDATORY)**

The Fiber Optic Cable industry is moving towards a Gel Free method to water proof the fibers within the buffer tubes. This will significantly reduce the time and effort it takes to clean the fiber in order to splice or terminate it. This specification supplemental replaces the "Gel Filled" requirement to "Gel Free" in order to follow the industry trend.

B. Measurement, Payment, Acceptance, and Documentation:

1. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications. **No Change**

2. How is Acceptance and Documentation handled? Existing (from the acceptance and documentation document), modified, or new acceptance and documentation to be included with all Standard Specifications or Supplemental Specifications. Include Contractor Submittals, Inspection Elements, and Documentation. **No Change**

C. Stakeholder Notification for AGC and ACEC:

Provide by e-mail, the AGC and ACEC Standards Committee member a copy of all pertinent information relating to the specification or drawing. Detail all responses on the Standards Committee Review Comments Form.

Note: There is a two-week response time set for this item.

Refer to the Standards Committee Web site, http://www.udot.utah.gov/go/standardscommittee to "Standards Committee Members" for the respective e-mail addresses.

AGC: (Document comments on the Comment Form)

ACEC: (Document comments on the Comment Form)

D. Stakeholders:
Document the stakeholders contacted on the Standards Committee Review Comments Form, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change.
Stakeholders:

Note: There is a two-week response time set for this item to allow Stakeholders time to process and respond to coordination requests. All areas should try to complete review and comment as soon as possible but within two weeks. Advise Stakeholder if less time is given the Stakeholder to complete this requirement.

Contact all applicable UDOT personnel, FHWA representative for the type item being reviewed, contractors and consultants contacted in addition to those contacted in paragraph "C" above, suppliers, manufacturers and any others as deemed appropriate. Include all those contacted on the Standards Committee Review Comments Form.

FHWA (Accomplished as part of the two-week process before submitting to the Standards section for inclusion on the Standards Committee agenda.) This is in addition to the requirements of UDOT Policy 08A5-01, procedure 08A5-01.3.

E. Other impacted areas, systems, or personnel. Consider all impacts and possible changes to these areas during the preparation process. Coordinate with all appropriate areas for the respective item. List all impacts and action taken.

1. Minimum Sampling and Testing Requirements **No Change**

2. Business Systems (Electronic Bid System, Project Development Business System, Electronic Program Management, Computer-Aided Drafting and Design, etc.) **No Change**

3. Implementation Plan (Provide detailed instructions on how the subject item will be implemented to include notification of all interested parties and training requirements.) **E-mail notice will be sent as part of the Standards Section's publishing process.**

4. What additional systems and documents need modification to reflect this change? **No Change**

F. Costs? (Estimates are acceptable.) **(MANDATORY)**

1. Cost Impact to the Department (For example, unit bid price, change in quantity, total scope impacts in year, increase in contractor's overhead or mobilization). **Splicing and termination of fibers may become less expensive.**
In an article that compared both products it was written:

"Number one, installers love it. It's much less mess for them to have to deal with when splicing or terminating the fibers. The second biggest benefit is that, because of the less involved prep for splicing and terminating, labor costs can be significantly reduced ……. Having to clean the gel from the fibers can significantly slow down the installation process and just be a plain mess for the lucky technician that has to splice or terminate this cable."

The new Gel Free cables do not require as much preparation time to perform the same task.

2. Operational (For example, maintenance, materials, equipment, labor, administrative, programming). **No Change**

3. Life cycle cost. **No Change**

G. Benefits? Provide details that can be used to complete a Cost – Benefit Analysis. Estimates are acceptable. What is the benefit of making this change if no cost is involved? **(MANDATORY) This change will allow the use of Gel Free cables thus following the industry trend as it phases out the older product.**

H. Safety Impacts? **No Change**

I. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

The current 13594 Standard of using the Gel Filled Fiber Optic Cable provides a better product for water proofing fibers and allows the fibers to float free within the buffer tubes giving them added protection. However, that creates some draw backs on fiber preparation for termination and splicing.

The Fiber Business Unit (FBU) informed me that the fiber optic cable industry is going to phase out the Gel Filled fiber cable and it will be getting harder to acquire for projects.

Therefore, the FBU decided to change the water proofing and fiber protection requirement to match the industry changes.

Timestamp	Email Address	REVIEWER	DRAWING #, SECTION #, ARTICLE #, ETC.	COMMENT	RESPONSE	RESPONSE BY
9/18/2019 15:56:50	kthornock@utah.gov	Kirk Thornock	13594M	No comments, makes sense		
9/19/2019 7:57:50	fdoehring@utah.gov	Fred Doehring	All	No Comments		
9/20/2019 17:02:38	michellepage@utah.gov	Michelle Page	13594M	No Comment		
9/23/2019 9:07:09	kbarrett@utah.gov	Kelly Barrett	13594M	No Comment		
9/23/2019 16:44:05	mcrasmussen@utah.gov	Marjorie Rasmussen	13594M	No comments		
9/26/2019 13:38:39	jtremaine@utah.gov	Janice Tremaine	13594 M Fiber Optic Communication	No Comment		
9/26/2019 18:13:27	branden@utah.gov	Branden Anderson	13594M	No Comment		
9/27/2019 12:02:33	rarnell@utah.gov	Rhett Arnell	13594M	No Comment		
9/27/2019 18:02:40	kentalbot@utah.gov	Ken Talbot	2.2 & 2.3	In the Submittal Sheet it was stated that the fiber industry is going to gel free fiber, what is the timing of that transition? Does it make sense to give contractors the option of gel filled or gel free until that transition is complete? If the Department doesn't care, there might be some opportunity to get some really cheap gel filled fiber until it is all gone.	Response - Fiber Business Unit: the Corning rep told me it was just going to get more expensive because most of the fiber that it being made is gel free. More or less its a special order right now and it has to be stamped DOT for us to use and that is somewhat a special order as well. I don't think there will be anything cheap.	Leon Hadley
9/30/2019 9:01:50	dpage@utah.gov	Danny Page	13594M	No Comment		
9/30/2019 9:23:52	shawnlambert@utah.gov	Shawn Lambert	13594M	No Comments		
9/30/2019 9:29:48	fdoehring@utah.gov	Fred	all	No comments		
9/30/2019 10:24:54	brettslater@utah.gov	Brett Slater	13594M	No comment		
9/30/2019 10:58:00	dlahusen@avenueconsulta	ACEC	13594M	No Comment.		
10/1/2019 7:23:53	GBLACKWELDER@utah.	Glenn Blackwelder	All	No comments		
10/2/2019 21:48:12	raycook@utah.gov	Ray Cook	13594M	No comment.		
10/4/2019 13:08:23	dfriant@utah.gov	Daryl Friant	13594M	No Comments		
10/7/2019 8:20:16	mcrasmussen@utah.gov	Marjorie Rasmussen	13594	No Comments		
10/9/2019 7:13:22	russell.robertson@dot.gov	FHWA	13594	No comments.		

Supplemental Specification
2017 Standard Specification Book

SECTION 13594M

FIBER OPTIC COMMUNICATION

Delete Article 2.2, Paragraph C and replace with the following:

2.2 FIBER OPTIC CABLE

C. Use gel free ~~filled~~ fiber optic cable complying with Telcordia GR20-CORE and TIA/EIA-4720000-A.

Delete Article 2.3, Paragraph A and replace with the following:

2.3 FIBER OPTIC DROP CABLE

A. Drop Cable
   1. Six single mode fibers
   2. All dielectric, non-armored cable
   3. Single buffer tube
   4. Gel free ~~filled~~
   5. Central core construction
   6. Rated at a minimum of 400 lb pulling tension
   7. Meets RUS requirements
   8. Supply with ST connectors only
   9. Locatable mule tape with each drop cable

Action Item Update for October 31, 2019 Standards Committee Meeting

Regular Action Items.

- Discussion Group for removal of design information from Standard Drawings. Group has been formed and meeting. Ongoing effort to removed design information from Standards Drawings. **(Ongoing)**

Current Assignments for the 2017 Standards:

Brad Yeates (Standards and Design)

- Update this list as required **(Ongoing)**

Closed Assignments

None

End of Agenda Package